

DOCUMENT RESUME

ED 339 797

CE 051 418

AUTHOR Santoki, Warren
TITLE How To Use a Table Saw To Perform Four Basic Operations. Lesson Plan No. 3, Building and Construction Technology II.
INSTITUTION Hawaii Univ., Manoa. Western Curriculum Coordination Center.
PUB DATE 17 Nov 88
NOTE 65p.
PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Behavioral Objectives; *Equipment Utilization; *Hand Tools; Learning Activities; Lesson Plans; Safety; *Trade and Industrial Education

ABSTRACT

This instructional unit is intended for use in teaching high school building and construction technology education students how to use a table saw in four basic operations: cross-cutting, ripping, dadoing, and beveling/mitering. The following materials are included: a lesson plan, transparency masters, student handouts, a safety exam, and a two-part table saw exam. The lesson plan includes lists of references, student equipment and required dress, equipment and audiovisual aids required, objectives, special remarks, and an instructional outline that is cross-referenced with methods of instruction and aids. (MN)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED339797

HOW TO USE A TABLE SAW TO PERFORM
FOUR BASIC FUNCTIONS

LESSON PLAN NO. 3

Warren Santoki

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

- ☒ This document has been reproduced as
received from the person or organization
originating it.
- ☐ Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official
OERI position or policy.

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

L. Zaretsky Santoki

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

2
BEST COPY AVAILABLE

817150-30

LESSON PLAN

LESSON PLAN NO. 3		NAME: ROOSEVELT HIGH SCHOOL		PAGE <u>1</u> OF <u>48</u> PAGES	
COURSE OF INSTRUCTION AND COURSE NUMBER: BUILDING AND CONSTRUCTION TECHNOLOGY II ACCN: V103			TOTAL HOURS: 100 hours	LESSON TITLE: HOW TO USE A TABLE SAW TO PERFORM FOUR BASIC OPERATIONS	
DAY AND DATE OF INSTRUCTION: THURSDAY NOVEMBER 17, 1988			HOURS 1:30 - 2:20 p.m.	PLACE: WIST ANNEX I, UNIVERSITY OF HAWAII-MANOA	
NO. OF STUDENTS: 15	REHEARSAL:	INSTRUCTOR AND ASSISTANTS: WARREN SANTOKI		STUDENT MATERIAL AND DRESS: 1. Wear work clothes 2. Wear safety shoes and goggles 3. Bring pencil and paper	
REFERENCES: Cliffe, Roger W., <u>Table Saw Techniques</u> , New York: Sterling Publishing Co., 1984, 352 pages Rockwell International, <u>10" Contractor's Saw:</u> <u>Instruction Manual</u> , Pennsylvania, 1978, 19 pages Delta Accessories Catalog, 1986, pgs. 1-10			EQUIPMENT AND AUDIO-VISUAL AIDS: 1. Pencil 2. Colored chalk 3. Pointer 4. Pointer (Transparency) 5. Overhead projector 6. Screen 7. Transparency 8. Handouts #1-24 9. Wood sample 10. Push stick 11. Wrenches 12. Blades 13. Table saw 14. Combination square 15. Sliding T-bevel 16. Tape rule 17. Safety goggles 18. Dado head insert 19. Plywood 20. Clamp 21. Stop block 22. 45 degree triangle		
OBJECTIVES: At the end of this 50 minute lesson the student will be able to: 1. Name and identify the 15 major parts of a table saw. 2. Name and describe the four common adjustments of the table saw. 3. Explain the four basic operations: a. Cross-cutting c. Dadoing b. Ripping d. Beveling/Mitering			SPECIAL REMARKS: 1. Set up overhead projector and screen. 2. Check and set up table saw. 3. Put lesson title and name on blackboard. 4. State the level of ability of the students: Usually 12th graders who have taken Woods I and II, Building and Construction I and who are planning to pursue a career in construction.		

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
I. Introduction A. Purpose 1. Today's lesson we will be studying the table saw and the methods for doing four basic operations: a. Cross-cutting b. Ripping c. Dadoing d. Beveling/Mitering These four basic operations will be demonstrated in a step-by-step manner. 2. We are also going to study the 15 major parts of the table and its four common adjustments. 3. The table saw is also referred to as a Bench saw, Tilting-arbor saw and Circular saw. B. Objectives At the end of this 50 minute lesson you, the student, will be able to: 1. Name and identify the 15 major parts of a table saw. 2. Name and describe the four common adjustments of the table saw. 3. Explain the four basic operations: a. Cross-cutting b. Ripping c. Dadoing	5 min. (1 min.) (1 min.) (1 min.) (1 min.)	State the purpose to the class Passout all handouts #1-24 Show the wood sample with the four different cuts. Refer students to handouts #3 and #4 Show the transparency on the overhead projector. Turn off the overhead projector. State the objectives to the students.

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
d. Beveling/Mitering C. Reason This type of saw is extremely popular with the carpenters and builders because of its great versatility. Production time and costs are significantly reduced due to the increased efficiency of the table saw.	(1 min.)	State the reason to the students. Ask the students if they can state any other reasons.
II. Explanation A. What is a table saw? A table saw is a stationary circular saw which is mounted on a work-table(usually cast-iron) so that the blade protrudes through the surface of the table.	42 min. (1 min.)	Ask students: What is a table saw? Give the answer if no one knows.
B. The 15 major parts of a table saw: 1. Miter gage- A device which enables cross-cutting at any angle. 2. Fence or Rip fence- A guide which controls the width of the cut for ripping operations. 3. Guide bars- Two bars located at the front and back of the table that act as "tracks" for the rip fence. 4. Fence clamp- A clamp which secures or releases the rip fence for adjustment. 5. Fence micro-set knob- Allows fine adjustment of the rip fence. 6. T-slot for miter gage- Guiding slot for miter gage which is	(8 min.)	Ask students: Can you identify any of the 15 major parts of a table saw? Show the transparency again. Ask each student to go up to the screen and point to one part with the pointer and state the name of the part and its function by referring to handouts #1 and #2.

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
located in the table top and is parallel to the saw blade. 7. Switch- Controls the on-off operation of the table saw. 8. Clean-out- Access opening for table saws with enclosed stands. 9. Saw guard- Protects the user from contact with the blade and also works with the anti-kickback device and splitter guard. 10. Blade insert- A cover which provides access for removal or installation of the saw blade. 11. Table- The work surface which guides and supports the work-piece. 12. Tilt scale- A gage for measuring the degree-of-angle in which the blade is tilted. 13. Raising handwheel- The handwheel which provides adjustment for the raising or lowering of the saw blade. 14. Tilting handwheel- The handwheel which provides adjustment for the angle or tilt of the blade. 15. Lock knob- Located on the raising and tilting handwheels as well as the miter gage. It secures the handwheel or gage so that there is no change in adjustment during operation. Summary The 15 major parts that we have just covered are important because they will be used to perform all operations on the table saw. There are many other accessories available that can greatly increase the operational capability of the table saw.		When the students are done turn the projector off. Move to the shop by the table saw and ask the students to, again, identify and name the 15 major parts on the real saw. State the summary to the students Ask the students if they have any questions. 10

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS												
E. Procedures for crosscutting: 1. Obtain the instructor's permission to use the saw. 2. Install a cross-cutting or combination blade on the arbor so that the teeth point toward the front of the saw. Put the blade insert back on. Check the perpendicularity of the blade to the table and to the miter gage. 3. Raise the saw blade so that it protrudes 1/8" - 1/4" above the workpiece. Tighten the lock knob. 4. Place the miter gage in the most convenient table slot and position the workpiece firmly against the miter gage. The rip fence should not be used as a guide but a stop block may be clamped to the front of the fence when cutting many pieces of the same length. 5. Start the cut slowly by feeding the stock into the blade making sure that the work is held firmly against the miter gage and the table. Also, make sure that the saw's kerf cuts on the waste side of the stock. 6. One of the rules in running a saw is never hang onto or touch a free piece of work. Hold the supported piece and not the piece that is cut off. 7. Continue feeding the stock until the piece is cut in two. Before returning the miter gage and the work back to the starting point, it's a good idea to shift the wood a little in a direction away from the saw blade so that the work	(8 min.)	Demonstration of cross-cutting operations: 1. Show cross-cut or combination blades. 2. Refer students to handouts #7, 11 and 14. 3. Mention safety rules where appropriate. 4. Use goggles. Materials <table><tr><td>1. Blades</td><td>7. Tape rule</td></tr><tr><td>2. Goggles</td><td>8. Combination square</td></tr><tr><td>3. Table saw wrenches</td><td>9. Pencil</td></tr><tr><td>4. Miter gage</td><td>10. Clamp</td></tr><tr><td>5. Table saw</td><td>11. Stop block</td></tr><tr><td>6. Plywood</td><td></td></tr></table> Refer students to handout #15 Refer students to handout #13 Ask students: What is a kerf? Answer- A kerf is a cut made by the cutting action of the saw blade.	1. Blades	7. Tape rule	2. Goggles	8. Combination square	3. Table saw wrenches	9. Pencil	4. Miter gage	10. Clamp	5. Table saw	11. Stop block	6. Plywood	
1. Blades	7. Tape rule													
2. Goggles	8. Combination square													
3. Table saw wrenches	9. Pencil													
4. Miter gage	10. Clamp													
5. Table saw	11. Stop block													
6. Plywood														

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
doesn't contact the blade as you slide it back. 8. Turn the motor off. Never pick up any short length (under 1') of free work from the table while the blade is spinning. Summary Cross-cutting is defined as: 1. Cutting across the grain. 2. Rough cutting stock to length regardless of the grain. 3. Cutting straight and angle dados. 4. Cutting bevels/miters. Never use the fence as a guide when cross-cutting. F. Now that we've finished doing cross-cutting operations let's go on to ripping. (1 min.) What is ripping? 1. Definitions a. Cutting with the grain b. Cutting a piece of wood in its longest dimension regardless of its grain G. Procedures for ripping: (8 min.) 1. Obtain the instructor's permission to use the saw. 2. Install a ripping or combination blade on the arbor so that the teeth point toward the front of the saw. Put the blade insert back on. Check the perpendicularity of the blade to the table with the combination square. 3. Raise the saw blade so that it protrudes 1/8" - 1/4" above		State the summary to the students. Ask the students if they have any questions. Ask students: What is ripping? Give the answer if no one knows. Refer students to handouts #3 and #10 Show the wood sample Demonstration of ripping operations: 1. Show rip or combination blades. 2. Refer students to handouts #7, 8, 11, 14 and 16. 3. Mention safety rules where appropriate. 4. Use goggles.

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS												
the workpiece. Tighten the lock knob. 4. Position the rip fence to the desired width of cut. When fine adjusting, the most accurate way of measuring is to use a tape rule to measure the distance between the fence and the blade. Measurements are to be taken from the fence to the tooth, on the blade, whose set is directed towards the fence. Two readings are taken, one for the front of the blade and one for the back. When you have adjusted the desired width of cut, secure the fence clamp. Make sure that the side of the work which rides along the fence is straight and the side that rests on the table is flat. 5. Turn the motor on and feed the work slowly into the blade. Stand to the side of the work so that your body isn't in the kickback zone. Use a push stick if you are ripping pieces less than 3" wide. Use a deadman or have someone assist you when cutting long or heavy work. Continue pushing the stock through until the cut is complete. You can pick your workpiece up directly after the cut, if it is convenient. If it isn't convenient, just leave it on the table or let it fall to the floor. Do not pick up the free or waste stock while the saw is running. 6. Turn the motor off. Summary Ripping is defined as:		Materials <table><tr><td>1. Blades</td><td>7. Tape rule</td></tr><tr><td>2. Goggles</td><td>8. Push stick</td></tr><tr><td>3. Table saw wrenches</td><td>9. Pencil</td></tr><tr><td>4. Rip fence</td><td>10. Combination square</td></tr><tr><td>5. Table saw</td><td></td></tr><tr><td>6. Plywood</td><td></td></tr></table> Ask students: Why is it necessary to take one reading for the front of the blade and one for the back? Answer- Having two identicle readings tells you that the fence is parallel to the blade. Refer students to handouts #16 and #17. Demonstrate the use of the push stick. State the summary to the students. Ask the students if they have any questions.	1. Blades	7. Tape rule	2. Goggles	8. Push stick	3. Table saw wrenches	9. Pencil	4. Rip fence	10. Combination square	5. Table saw		6. Plywood	
1. Blades	7. Tape rule													
2. Goggles	8. Push stick													
3. Table saw wrenches	9. Pencil													
4. Rip fence	10. Combination square													
5. Table saw														
6. Plywood														

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
1. Cutting with the grain. 2. Cutting wood in its longest dimension regardless of the grain. When fine adjusting, use a tape rule to take two measurements, one on the front of the blade and one on the back of the blade. The measurements are taken from the fence to the tooth on the blade whose set is pointed towards the fence. H. We've already gone through cross-cutting and ripping operations so let's go into dadoing. What is dadoing? 1. Definitions a. Dadoing is cutting a rabbet or a wide groove into the work. b. Dadoing is mainly used when making a dado joint. 2. Two types of dado head a. Blades and Chippers- consists of blades and chippers that can be set from 1/8" - 13/16" by adding or subtracting chippers. b. Tapered washer dado set (Quick-set)- with the tapered washer dado set, the fixed steel tool bits are cocked at an angle depending on the setting of the tapered washer. This dado head can be set for 1/4" - 13/16" cuts. The advantages to this type of dado head are: a clean, flat-bottomed cut is achieved and the adjustment of cut is quick and easy.	(1 min.)	Ask students: What is dadoing? Give the answer if no one knows. Refer students to handout #4 Show the wood sample Show the both types of dado heads Refer students to handout #12

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS										
I. Procedures for dadoing: 1. Obtain the instructor's permission to use the saw. 2. Install a dado head on the arbor shaft so that the teeth point toward the front of the saw. Make sure that the dado head is adjusted to the desired width of cut. You must replace the blade insert with the dado head insert for dadoing operations. 3. If you are ripping with the dado head, adjust and secure the rip fence to the desired width of cut. Use ripping procedures. 4. If you are cross-cutting with the dado head, adjust and secure the miter gage to the desired setting. Again, do not use the rip fence as a guide. Use cross-cutting procedures. 5. Raise the dado head to the desired depth of cut and secure by tightening the lock knob. 6. Test all adjustments on a scrap piece of wood first to make sure that the desired cut will be achieved. If the cut is wrong, readjust and retest until the cut is correct. Use the combination square to check the depth of the cut. 7. Proceed by making the cut on the real workpiece. 8. Turn the motor off. Summary Dadoing is defined as: 1. Cutting a rabbet or wide groove into the work. 2. Making a dado joint. The two different types of dado head	(8 min.)	Demonstration of dadoing operations: 1. Show the dado heads. 2. Refer students to handouts #8, 9, 18, 19 and 20. 3. Mention safety rules where appropriate. 4. Use goggles Materials <table><tr><td>1. Dado head</td><td>6. Pencil</td></tr><tr><td>2. Goggles</td><td>7. Dado insert</td></tr><tr><td>3. Table saw wrenches</td><td>8. Combination square</td></tr><tr><td>4. Table saw</td><td>9. Tape rule</td></tr><tr><td>5. Plywood</td><td></td></tr></table> Ask students: Why must you replace the blade insert with the dado head insert? Answer- Dado heads can be adjusted for wider cuts, therefore, the slot on the blade insert must be wider. Ask students: Why should you make a test cut first? Answer- Since the cutting action of the dado head usually cannot be seen, you will not be aware of a mistake until after the cut is made. State the summary to the students. Ask the students if they have any questions.	1. Dado head	6. Pencil	2. Goggles	7. Dado insert	3. Table saw wrenches	8. Combination square	4. Table saw	9. Tape rule	5. Plywood	
1. Dado head	6. Pencil											
2. Goggles	7. Dado insert											
3. Table saw wrenches	8. Combination square											
4. Table saw	9. Tape rule											
5. Plywood												

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS												
1. Blades and Chippers 2. Tapered washer dado set Dados can be made using either cross-cutting or ripping operations. J. Now that we've covered cross-cutting, ripping and dadoing operations, the last operation that we will go into is beveling/mitering. What is Beveling/Mitering? 1. Definitions a. Beveling is a cut that is mainly used to make a 45 degree angle joint by tilting the blade 45 degrees. b. Mitering is a cut that is mainly used to make a 45 degree angle joint by setting the miter gage to 45 degrees. K. Procedures for Beveling/Mitering 1. To make a bevel cut, turn the tilting handwheel until the blade is at a 45 degree angle and follow ripping procedures. Use the sliding T-bevel to set the angle of the blade. 2. To make a miter cut, adjust the miter gage to a 45 degree angle and follow cross-cutting procedures. Use the 45 degree triangle or the combination square to set the miter gage angle. Summary Beveling is a cutting operation that is mainly used to make a 45 degree angle joint by tilting the blade 45 degrees.	(1 min.) (1 min.)	Ask students: What is beveling/mitering? Give the answer if no one knows. Refer students to handout #3 Show the wood sample Demonstration of beveling/mitering operations: 1. Refer students to handouts #9, 21, 22, 23 and 24. 2. Mention safety rules where appropriate. 3. Use goggles Materials <table><tr><td>1. Blade</td><td>7. T-bevel</td></tr><tr><td>2. Goggles</td><td>8. 45 degree triangle</td></tr><tr><td>3. Table saw</td><td>9. Miter gage</td></tr><tr><td>4. Table saw wrenches</td><td>10. Combination square</td></tr><tr><td>5. Plywood</td><td></td></tr><tr><td>6. Pencil</td><td></td></tr></table>	1. Blade	7. T-bevel	2. Goggles	8. 45 degree triangle	3. Table saw	9. Miter gage	4. Table saw wrenches	10. Combination square	5. Plywood		6. Pencil	
1. Blade	7. T-bevel													
2. Goggles	8. 45 degree triangle													
3. Table saw	9. Miter gage													
4. Table saw wrenches	10. Combination square													
5. Plywood														
6. Pencil														

23

24

PRESENTATION

OUTLINE OF INSTRUCTION	TIME	METHODS OF INSTRUCTION AND AIDS
Mitering is a cutting operation that is mainly used to make a 45 degree angle joint by setting the miter gage to 45 degrees. III. Summary We should now be pretty familiar with the parts, adjustments and operations of a table saw. There are many other operations that are possible with additional accessories. These additional accessories greatly increase the versatility of the table saw. Builders and carpenters rely on this versatility to save them time and money. Table saws are also widely used in homeshops and schools. Many of the wood projects on display at the Industrial Arts and Crafts Fair were made using the table saw and its accessories.	3 min.	State the summary to the students Ask the students if they have any questions. Review the 15 major parts, four common adjustments and the four basic operations. State the summary to the students. Give the safety exam and the table saw exams part I and part II after the students have been given two days (or one weekend) to study. The students must score 95% or better on all the exams in order to pass, otherwise, they must re-take it.

BENCH SAW

Name: _____
Last First

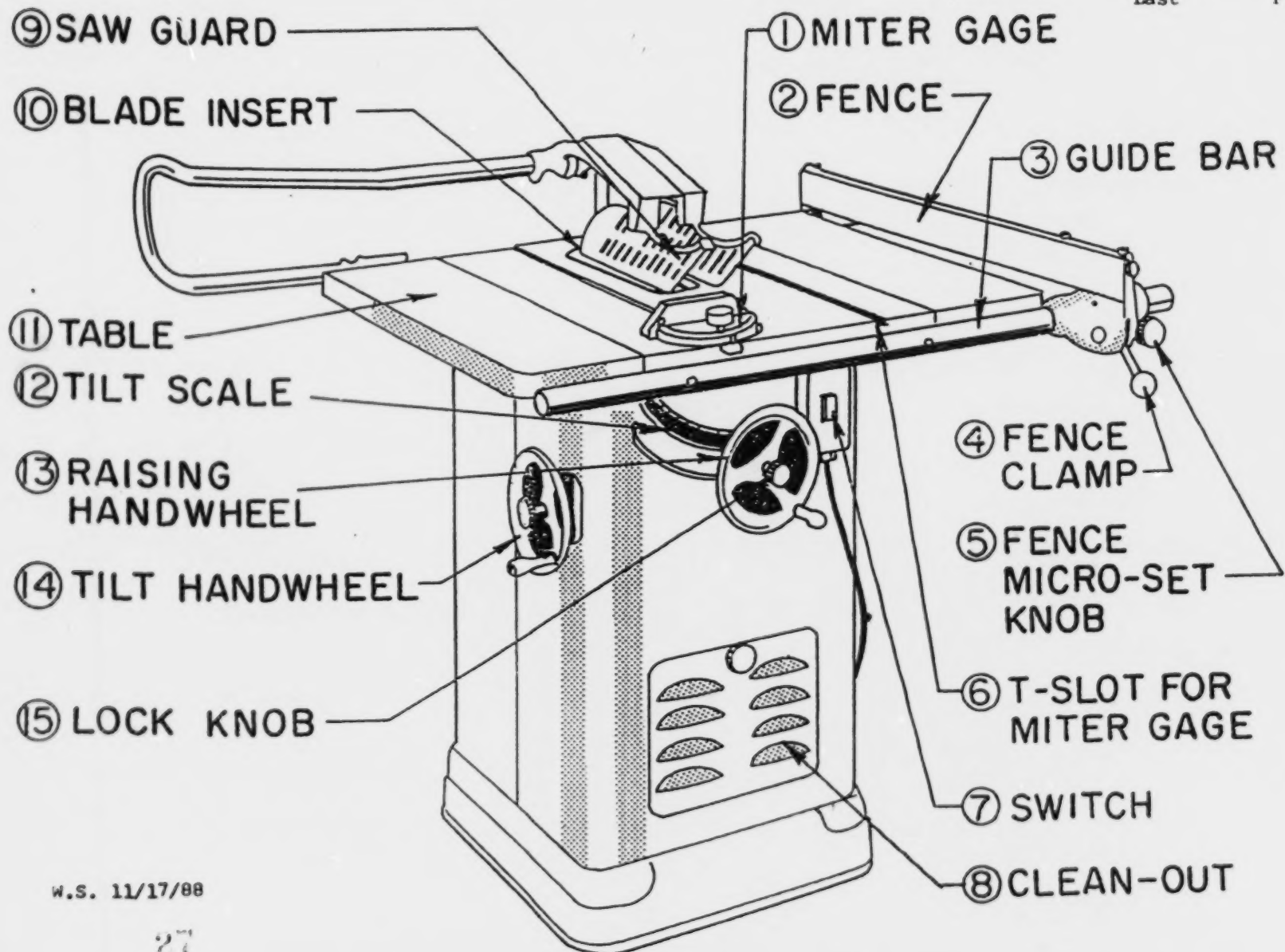


TABLE SAW
PARTS LIST AND FUNCTION

1. Miter gage- Device which enables cross-cutting at any angle.
2. Rip fence- A guide which controls the width of the cut for ripping operations.
3. Guide bars- Two bars located at the front and back of the table which serves as tracks for the rip fence.
4. Fence clamp- Clamp which secures or releases rip fence for adjustment.
5. Fence micro-set knob- Allows fine adjustment of the rip fence.
6. T-slot for miter gage- Guiding slot for the miter gage which is located in the table top and is parallel to the saw blade.
7. Switch- Controls on/off operation of the table saw.
8. Clean out- Access opening for table saws with enclosed stands.
9. Saw guard- Protects user from contact with the blade and also works with the anti-kickback device and splitter guard.
10. Blade insert- Cover which provides access for removal or installation of the saw blade.
11. Table- Work surface which guides and supports workpiece.
12. Tilt scale- Gage for measuring the degree of angle in which the blade is tilted.
13. Raising handwheel- Provides adjustment for the raising or lowering of the saw blade.
14. Tilt handwheel- Provides adjustment for the angle or tilt of the blade.
15. Lock knob- Located on raising and tilting handwheels and miter gage. It secures the handwheel or gage so that there is no change in the adjustment during operation.

FOUR COMMON ADJUSTMENTS

1. Raise or lower the saw blade.
2. Tilt the saw blade.
3. Adjust the rip fence to the left or to the right.
4. Adjust the angle of the miter gage.

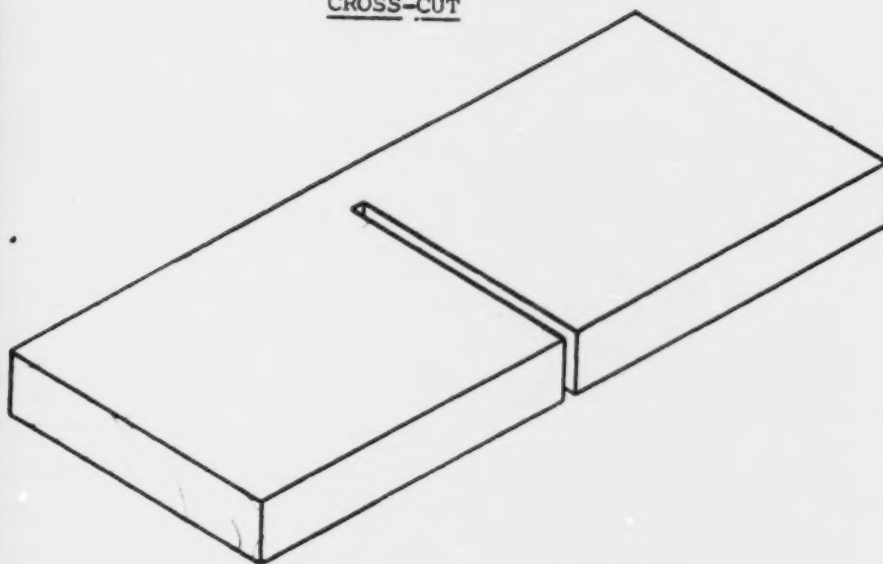
Handout # 3

Page 15 of 48 pages

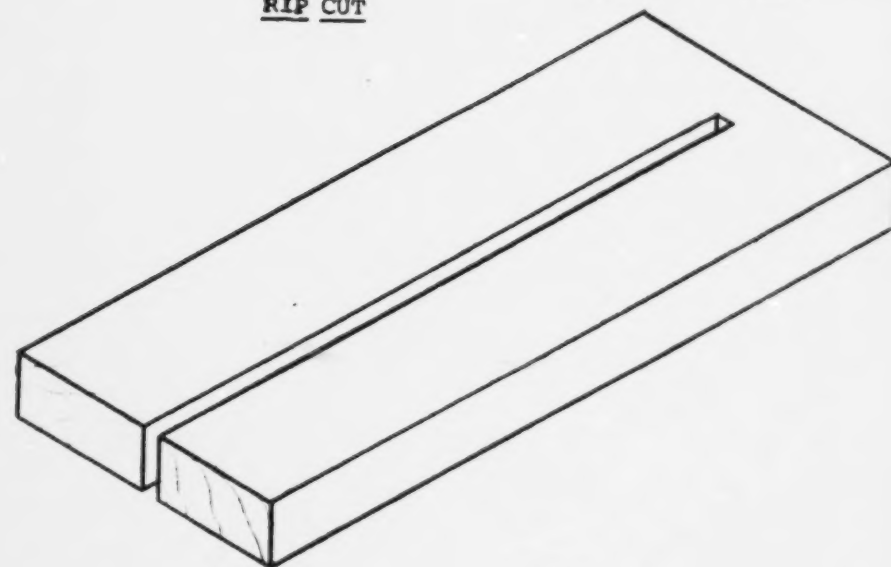
Name: _____

Last First

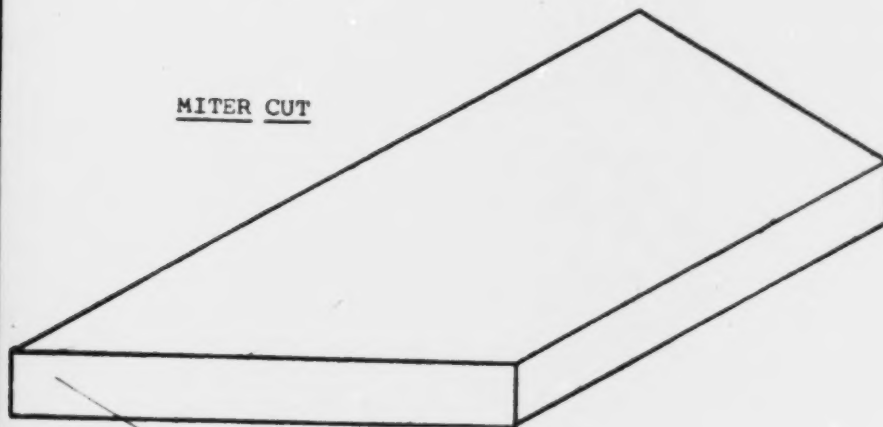
CROSS-CUT



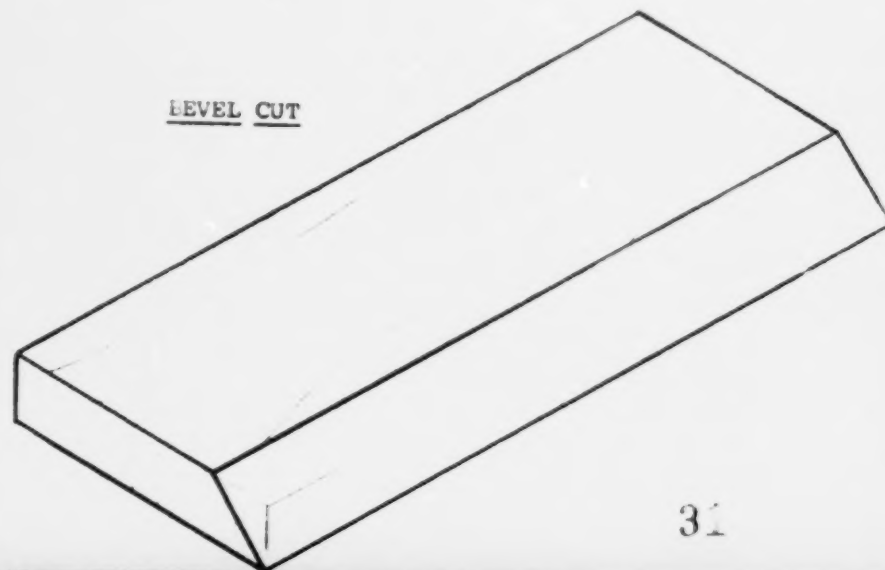
RIP CUT



MITER CUT



LEVEL CUT



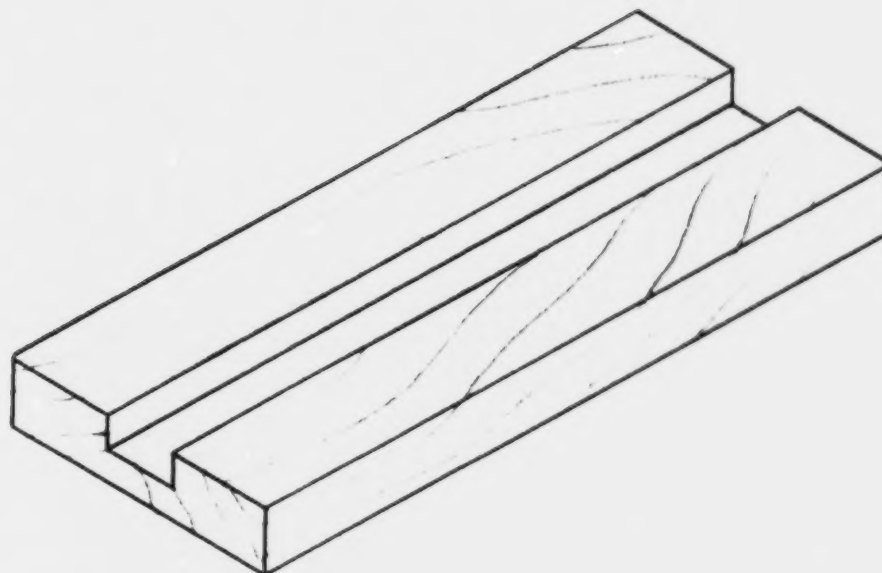
30

W.S 11/17/88

31

DADO CUT

Name: _____
Last First



Name: _____

Last

First

SAFETY RULES FOR ALL TOOLS

1. KNOW YOUR POWER TOOL. Read the owner's manual carefully. Learn the tools applications and limitations, as well as the specific potential hazards peculiar to it.

2. KEEP GUARDS IN PLACE and in working order.

3. GROUND ALL TOOLS. If tool is equipped with three-prong plug, it should be plugged into a three-hole electrical receptacle. If an adapter is used to accommodate a two-prong receptacle, the adapter lug must be attached to a known ground. Never remove the third prong.

4. REMOVE ADJUSTING KEYS AND WRENCHES. Form habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.

5. KEEP WORK AREA CLEAN. Cluttered areas and benches invite accidents.

6. AVOID DANGEROUS ENVIRONMENT. Don't use power tools in damp or wet locations, or expose them to rain. Keep work area well lighted.

7. KEEP CHILDREN AND VISITORS AWAY. All children and visitors should be kept a safe distance from work area.

8. MAKE WORKSHOP KIDPROOF - with padlocks, master switches, or by removing starter keys.

9. DON'T FORCE TOOL. It will do the job better and be safer at the rate for which it was designed.

10. USE RIGHT TOOL. Don't force tool or attachment to do a job it was not designed for.

11. WEAR PROPER APPAREL. No loose clothing, gloves, neckties, or jewelry to get caught in moving parts. Nonslip footwear is recommended. Wear protective hair covering to contain long hair.

12. USE SAFETY GLASSES. Also use face or dust mask if cutting operation is dusty.

13. SECURE WORK. Use clamps or a vise to hold work, when practical. It's safer than using your hand and frees both hands to operate tool.

14. DON'T OVERREACH. Keep your proper footing and balance at all times.

15. MAINTAIN TOOLS IN TOP CONDITION. Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

16. DISCONNECT TOOLS before servicing and when changing accessories such as blades, bits, cutters.

17. USE RECOMMENDED ACCESSORIES. Consult the owner's manual for recommended accessories. The use of improper accessories may cause hazards.

18. AVOID ACCIDENTAL STARTING. Make sure switch is in "OFF" position before plugging in cord.

19. NEVER STAND ON TOOL. Serious injury could occur if the tool is tipped or if the cutting tool is accidentally contacted.

20. CHECK DAMAGED PARTS. Before further use of the tool, a guard or other part that is damaged should be carefully checked to ensure that it will operate properly and perform its intended function - check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.

21. DIRECTION OF FEED. Feed work into a blade or cutter against the direction of rotation of the blade or cutter only.

22. NEVER LEAVE TOOL RUNNING UNATTENDED. TURN POWER OFF. Don't leave tool until it comes to a complete stop.

23. DRUGS, ALCOHOL, MEDICATION. Do not operate tool while under the influence of drugs, alcohol or any medication.

Name: _____

Last

First

ADDITIONAL SAFETY RULES FOR CIRCULAR SAWS

1. **ALWAYS** use guard, splitter and anti-kickback fingers on all "thru-sawing" operations. Thru-sawing operations are those when the blade cuts completely through the work piece as in ripping or cross cutting.
2. **ALWAYS** hold the work firmly against the miter gage or fence.
3. **ALWAYS** use a push stick for ripping narrow stock. Refer to ripping applications in instruction manual where push stick is covered in detail.
4. **NEVER** perform any operation "free-hand" which means using your hands to support or guide the work piece. Always use either the fence or the miter gage to position and guide the work.
5. **NEVER** stand or have any part of your body in line with the path of the saw blade.
6. **NEVER** reach behind or over the cutting tool with either hand for any reason.
7. **MOVE** the rip fence out of the way when cross cutting.
8. **WHEN** cutting mouldings, **NEVER** run the stock between the fence and the moulding cutterhead. Refer to moulding applications in instruction Manual for details.
9. **DIRECTION OF FEED.** Feed work into a blade or cutter against the direction or rotation of the blade or cutter only.
10. **NEVER** use the fence as a cut-off gage when cross cutting.
11. **NEVER** attempt to free a stalled saw blade without first turning the saw OFF.
12. **PROVIDE** adequate support to the rear and sides of the saw table for wide or long workpieces.
13. **AVOID KICKBACKS** (work thrown back toward you) by keeping blade sharp, keeping rip fence parallel to the saw blade, keeping splitter and antikickback fingers and guard in place and operating, by not releasing work before it is pushed all the way past the saw blade, and by not ripping work that is twisted or warped or does not have a straight edge to guide along the fence.
14. **AVOID** awkward operations and hand positions where a sudden slip could cause your hand to move into the cutting tool.

Handout # 7

Name: _____
Last First

TABLE SAW PROCEDURES

Procedures for cross-cutting:

1. Obtain the instructor's permission to use the saw.
2. Install a cross-cutting or a combination saw blade on the arbor so that the teeth point toward the front of the saw. Put the blade insert back on.
3. Raise the saw blade so that it protrudes 1/8"-1/4" above the workpiece. Tighten the lock knob.
4. Place the miter gage in the most convenient table slot and position the workpiece firmly against the miter gage. The rip fence should not be used as a guide but a stop block may be clamped to the front of the fence when cutting many pieces of the same length. Make sure the stock to be cut is free of nails, paint, sand, etc....
5. Start the cut slowly by feeding the stock into the blade making sure that the work is held firmly against the miter gage and the table. Also, make sure that the saw's kerf cuts on the waste side of the stock.
6. One rule in running a saw is: Never hang onto or touch a free piece of work. Hold the supported piece and not the piece that is cut off.
7. Continue feeding the stock until the piece is cut in two. Before returning the miter gage and work back to the starting point, it's a good idea to shift the wood a little in a direction away from the saw blade so that the work doesn't contact the blade when you slide it back.
8. Turn the motor off. Never pick up any short length (under 1') of free work from the table while the blade is spinning.

Procedures for ripping:

1. Obtain the instructor's permission to use the saw.

Handout # 8

Name: _____
Last First

2. Install a ripping or a combination blade so that the teeth point toward the front of the saw. Put the blade insert back on.
3. Raise the saw blade so that it is 1/8"-1/4" above the workpiece. Tighten the lock knob.
4. Position the rip fence to the desired width of cut. When fine adjusting, the most accurate way of measuring is to use a tape rule to measure the distance between the fence and the blade. Measurements are to be taken from the fence to the tooth, on the blade, whose set is directed towards the fence. Two readings are taken, one for the front of the blade and one for the back. When you have adjusted the desired width of cut, secure the fence clamp. Make sure that the side of the work which rides along the fence is straight and the side that rests on the table is flat. Make sure the stock to be cut is free of nails, paint, sand, etc....
5. Turn the motor on and feed the work slowly into the blade. Use a push stick if you are ripping pieces less than 3" wide. Continue pushing the stock through until the cut is complete. If it is convenient you can pick the piece up directly after the cut, if not, just leave it on the table or let it fall to the floor. Do not pick up the free or waste stock while the saw is running.
6. Turn off the motor.

Procedures for dadoing:

1. Obtain the instructor's permission to use the saw.
2. Install a dado head on the arbor so that the teeth point toward the front of the saw. Make sure that the dado head is adjusted to the desired width of cut. You must replace the blade insert with the dado head insert for dadoing operations.
3. If you are ripping with the dado head, adjust and secure the rip fence to the desired width of the cut.
4. If you are cross-cutting with the dado head, adjust and secure the miter gage to the desired setting. Again, do not use the rip fence as a guide.

W.S. 11/17/88

Handout # 9

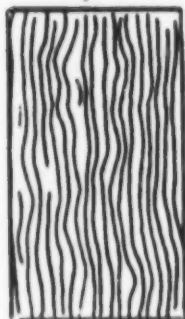
Name: _____
 Last First

5. Raise the dado head to the desired depth of cut and secure by tightening the lock knob.
6. Make a test cut on a scrap piece of wood first to make sure that the desired cut will be achieved. If the cut is wrong, readjust and retest until the cut is correct.
7. Proceed by making the cut on the real workpiece.
8. Turn the motor off.

Procedures for beveling/mitering:

1. To make a bevel cut, turn the tilting handwheel until the blade is at a 45 degree angle and follow ripping procedures.
2. To make a miter cut, adjust the miter gage to a 45 degree angle and follow cross-cutting procedures.

CROSSCUT SAW IS
INEFFICIENT
CUTTING THIS WAY

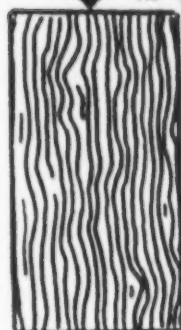


CROSSCUT SAW IS
EFFICIENT CUTTING
THIS WAY



Crosscutting is done across the grain or stringy fibres. A crosscut blade with pointed teeth works best for this operation.

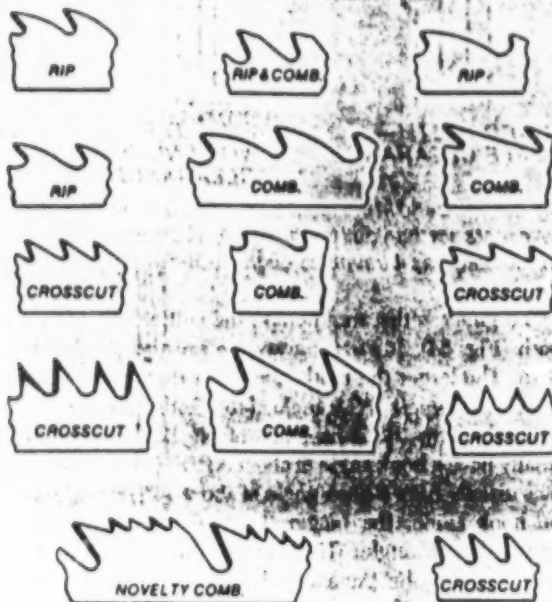
RIP SAW IS
EFFICIENT CUTTING
THIS WAY



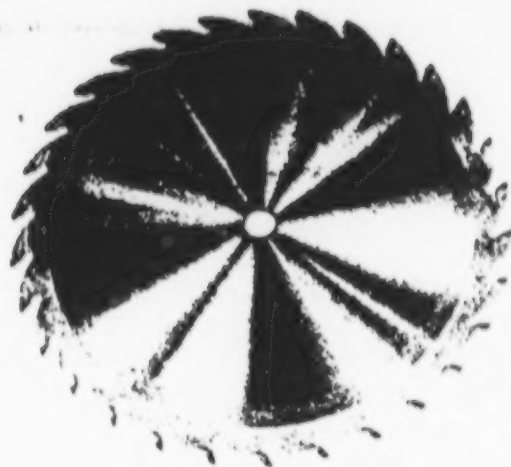
RIP SAW IS
INEFFICIENT
CUTTING THIS WAY



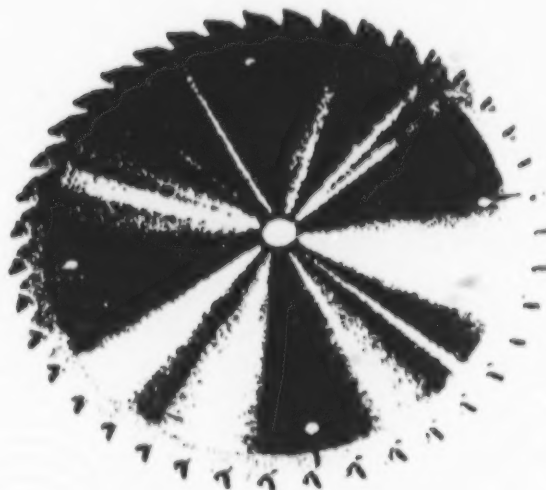
Ripping is done with the grain or stringy fibres. A rip blade with chisel-shaped teeth is best for ripping.



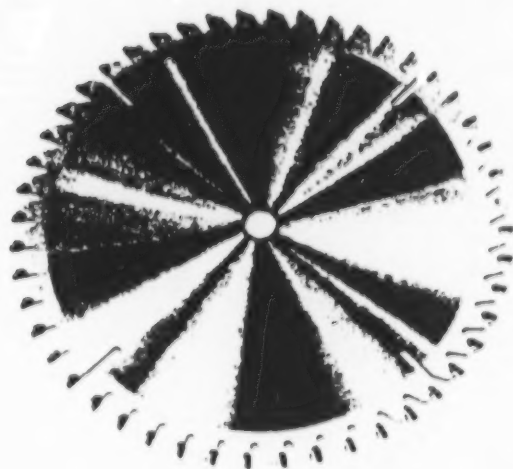
Tooth shapes of combination blades.



This carbide-tipped blade is a rip blade. It works well for ripping stock 1 inch (25 mm) or thinner. It has too many teeth (30) to rip 2-inch (51-mm) stock easily.



This 40-tooth carbide-tipped combination blade is well suited to general cutting in stock up to 2 inches (51 mm) thick.



This 48-tooth carbide-tipped blade is designed for crosscutting and trimming plastic laminates.

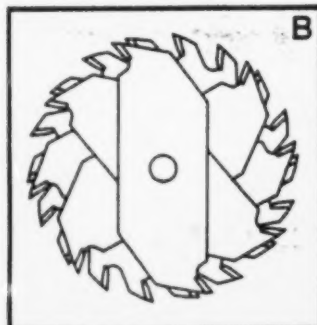
Name: _____

Last

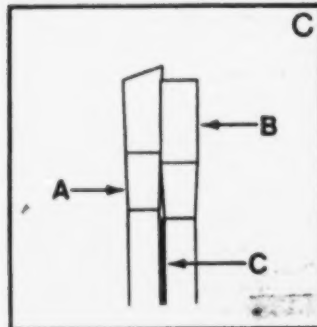
First



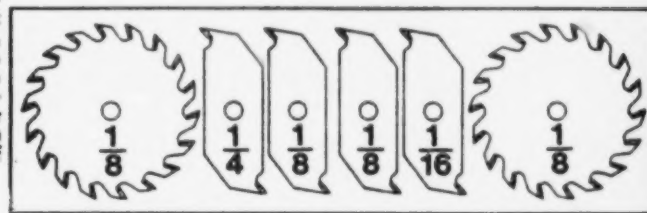
For grooves 1/4" wide, use both outside blades, set face to face. Fig. A illustrates how the teeth should be arranged. See that the blades do not move from this position when tightened on the arbor.



For other size grooves, arrange the required inside cutters between the two outside blades to make the width of the groove desired. When more than one inside cutter is required, they should be placed so that their cutting edges are evenly distributed around the circumference of the dado. Do not permit the swaged portions of the two inside cutters to come together, as this will keep the cutters apart at their centers and prevent proper operation. Fig. B illustrates the proper arrangement, one of the outside blades being removed to show the inside cutters clearly.



You have the opportunity of adjusting the width of the groove by using a few thin paper washers, as shown in Fig. C, in which (A) is the outside cutter, (B) is the inside cutter and (C) is the paper washer. Cut these washers from tough paper, about 2-1/2" in diameter, and with a 5/8" or 1" center hole. As shown in Fig. C, the swaged portion of inside cutter (B) overlaps the inner face of the outside cutter (A) enough to allow a wide range of adjustment.



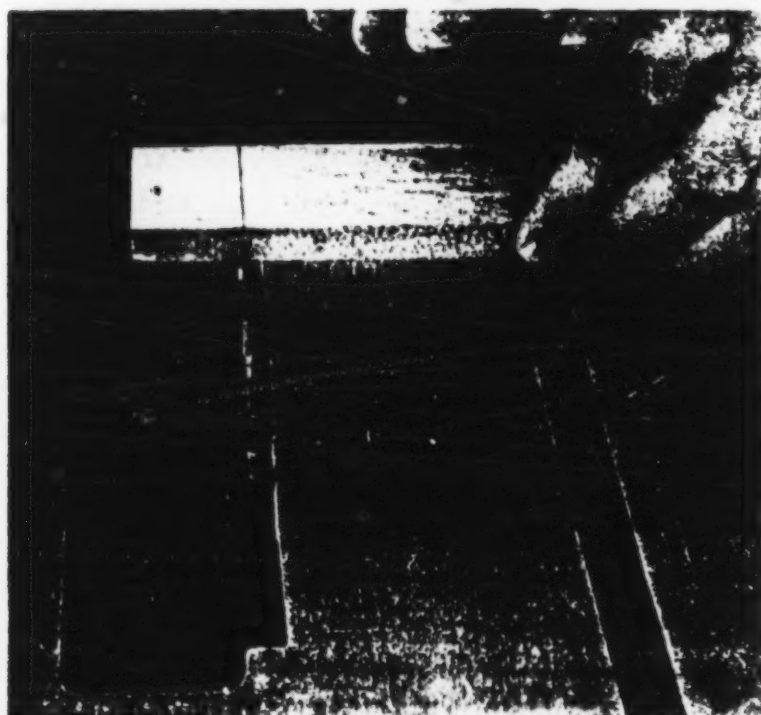
TAPERED WASHER DADO SET



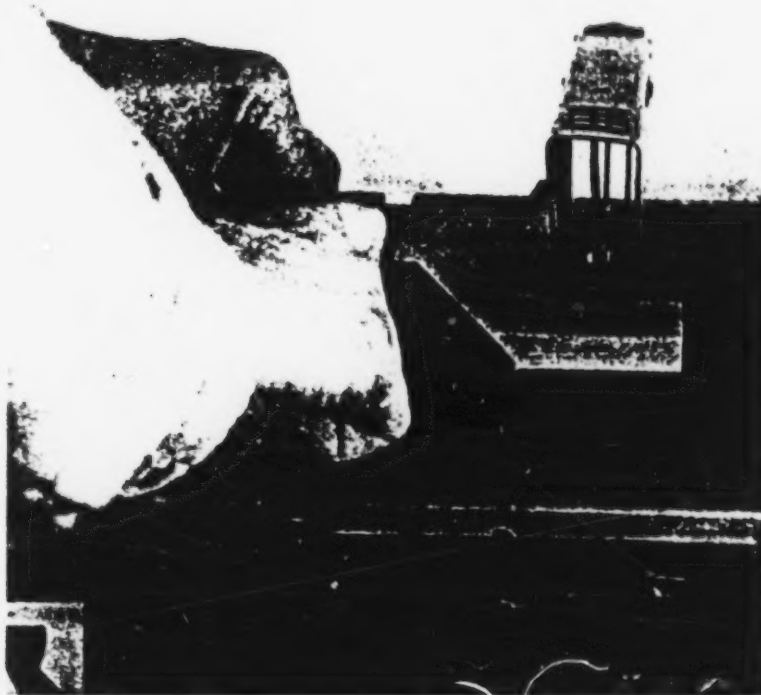
Name: _____

Last

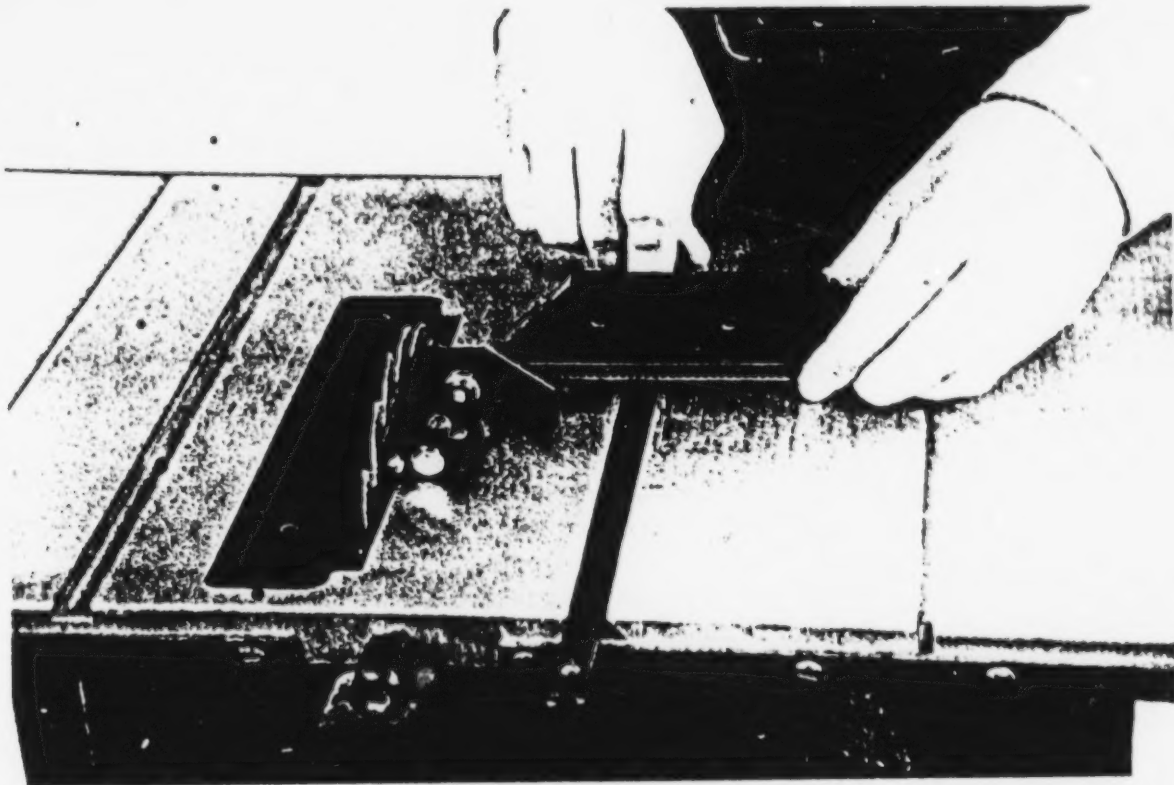
First



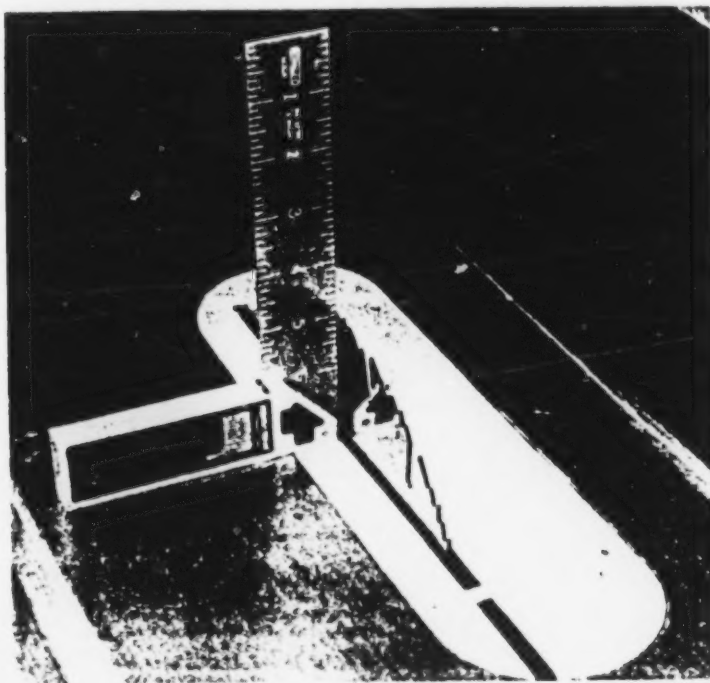
The layout line should line up with a tooth that points towards it. The rest of the blade should cut into the waste or scrap side of the work.



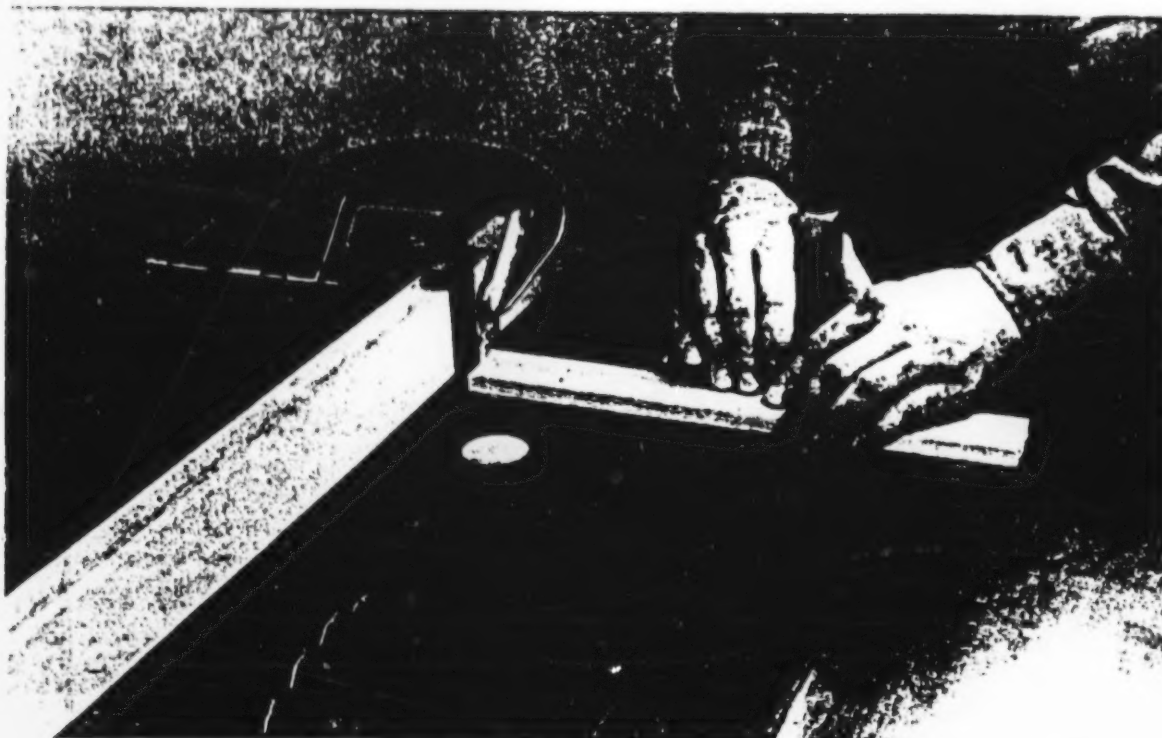
Advance the mitre gauge into the blade at a moderate speed when crosscutting. Feeding too slowly wastes time, and feeding too quickly increases tear-out. Keep the good or exposed face of your work up so that any tear-out occurs on the back or unexposed side of the work.



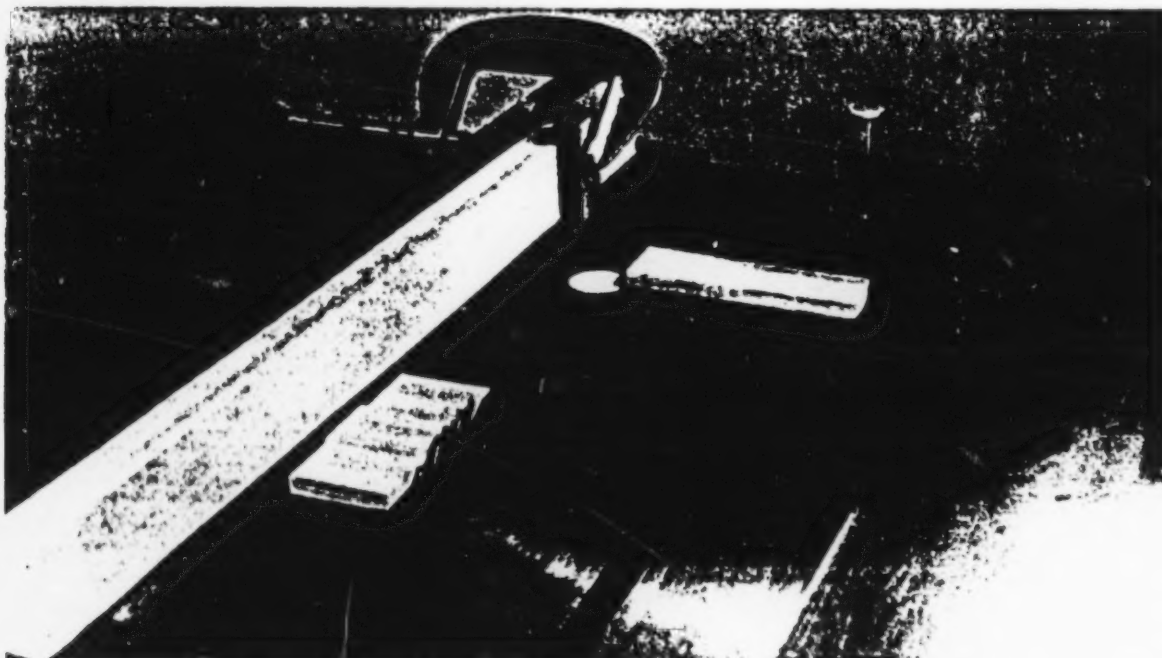
While making a square cut, make sure the blade is perpendicular to the mitre gauge



In addition to being perpendicular with the mitre gauge, the blade must also be perpendicular to the table



The stop block clamped to the fence makes all pieces equal in length and keeps stock from being pinched between the fence and blade. The stock is butted to the stop block and then cut.



Notice how all parts are cut uniformly. By keeping the stop block well away from the blade, no chance for a kickback exists.

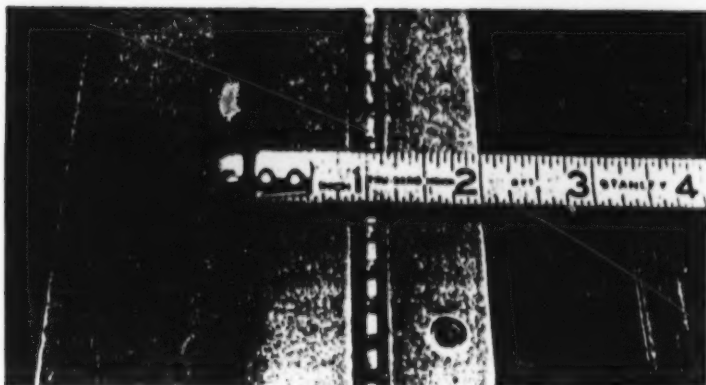
W.S. 11/17/38

BEST COPY AVAILABLE

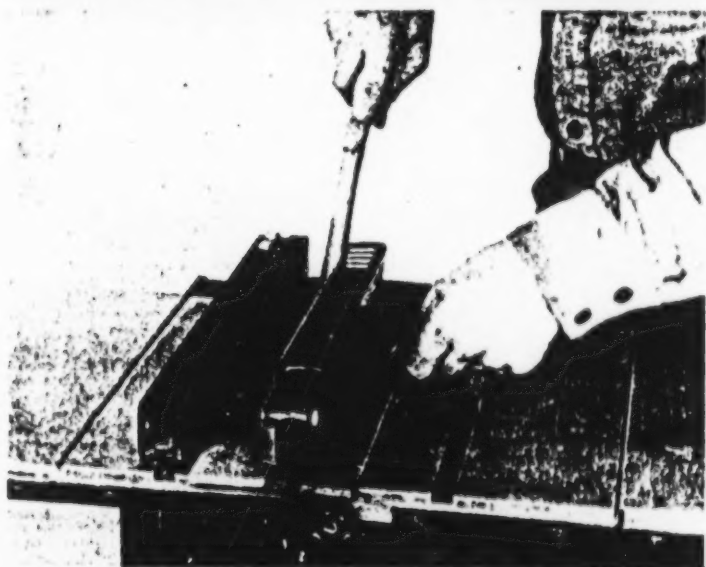
Name: _____

Last

First



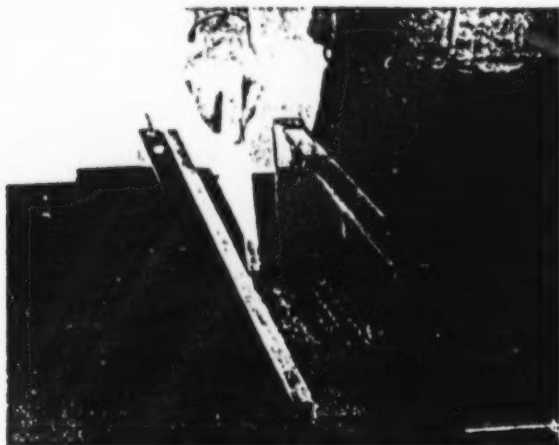
Set the distance from the fence to a tooth that points towards the fence. This distance determines the rip dimension. The set-up shown is set for a 1-inch (25-mm) rip.



When ripping, guide the work into the blade at a uniform speed. If the blade slows down, you are feeding too fast. Burned edges can mean the blade is dull or you are feeding too slowly.



A low-set blade ($\frac{1}{4}$ -inch [6 mm] above the work) is important. This minimizes your chance of contact with the blade and reduces the kickback hazard.



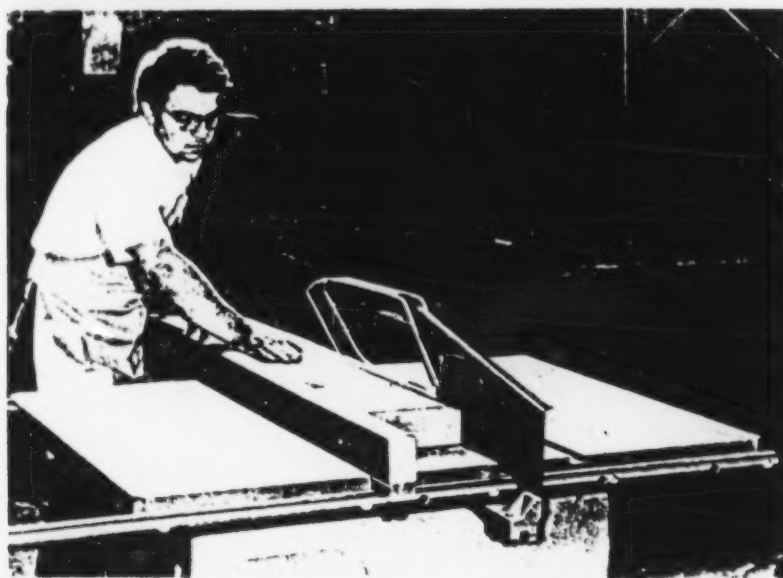
Standing to the side of the work when ripping keeps your body out of the kickback zone.



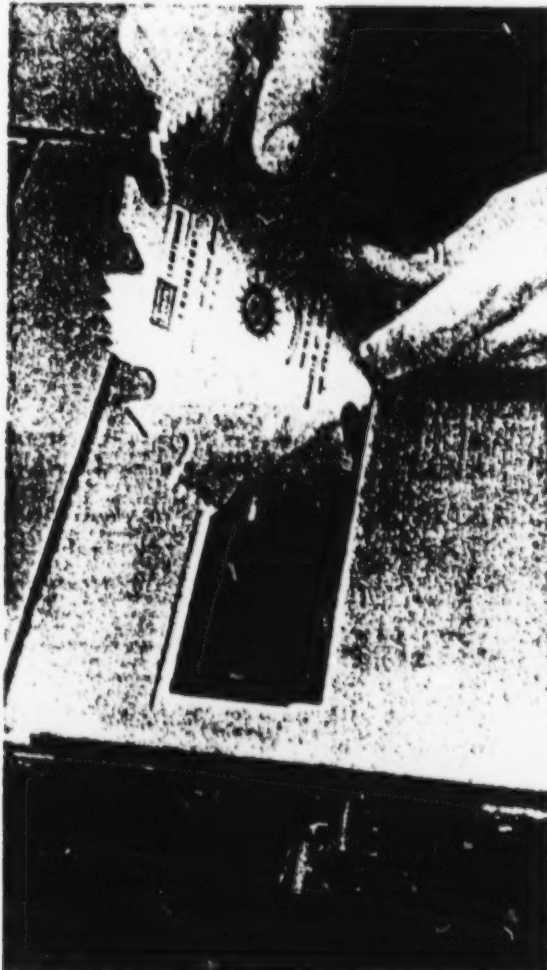
The splitter keeps the kerf open when a piece is ripped. This minimizes the chance of pinching and kickback.



When ripping long pieces, use a dead man to support the work.



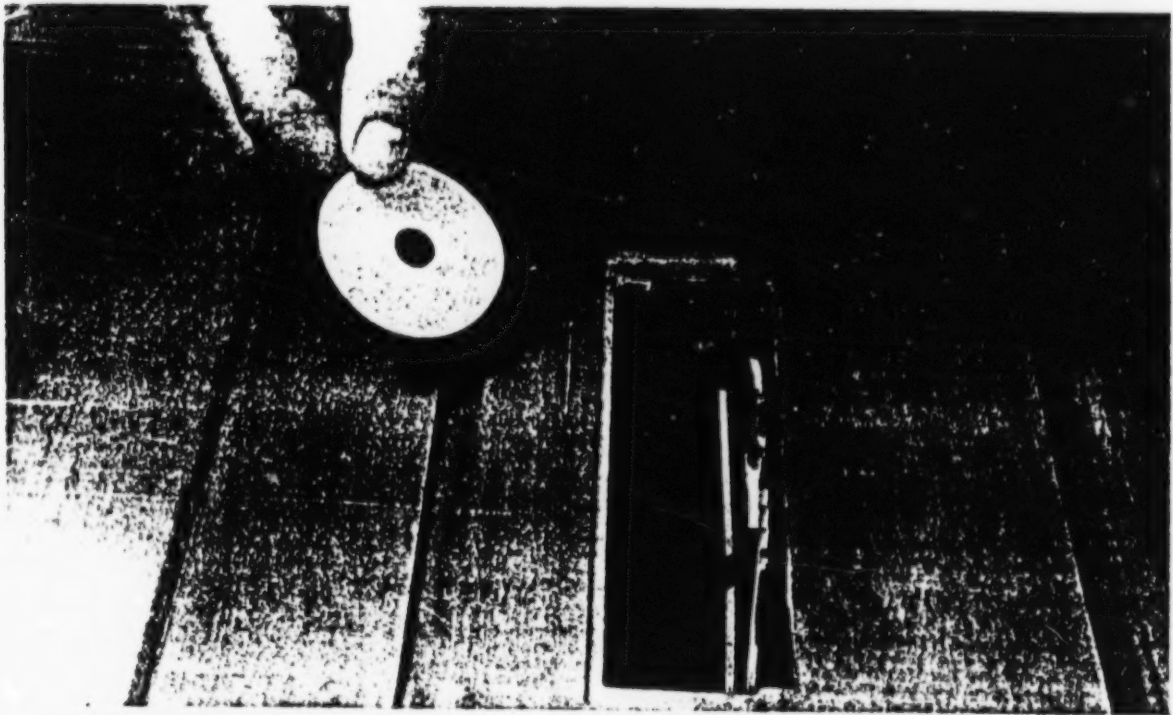
Large, heavy pieces may require an extra person to support the stock on the way in or out. Avoid ripping heavy pieces of stock alone. It is difficult to handle, control and guide them safely.



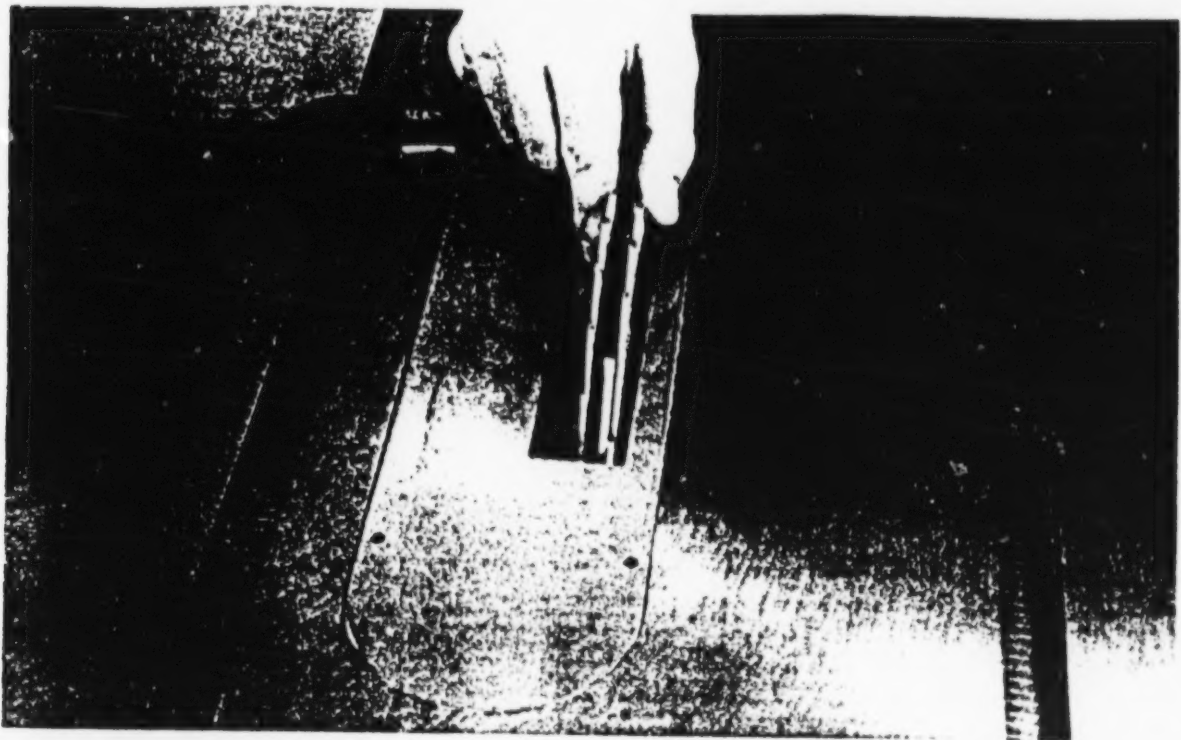
A dado size is selected, and the cutter is placed on the arbor. Cutter teeth should point towards the front of the saw. Be sure the power is disconnected before you begin.



The chippers are added after the cutter is mounted. Be sure to stagger the chippers so the dado head is balanced.



Paper washers may be added for slight adjustments in dado width.

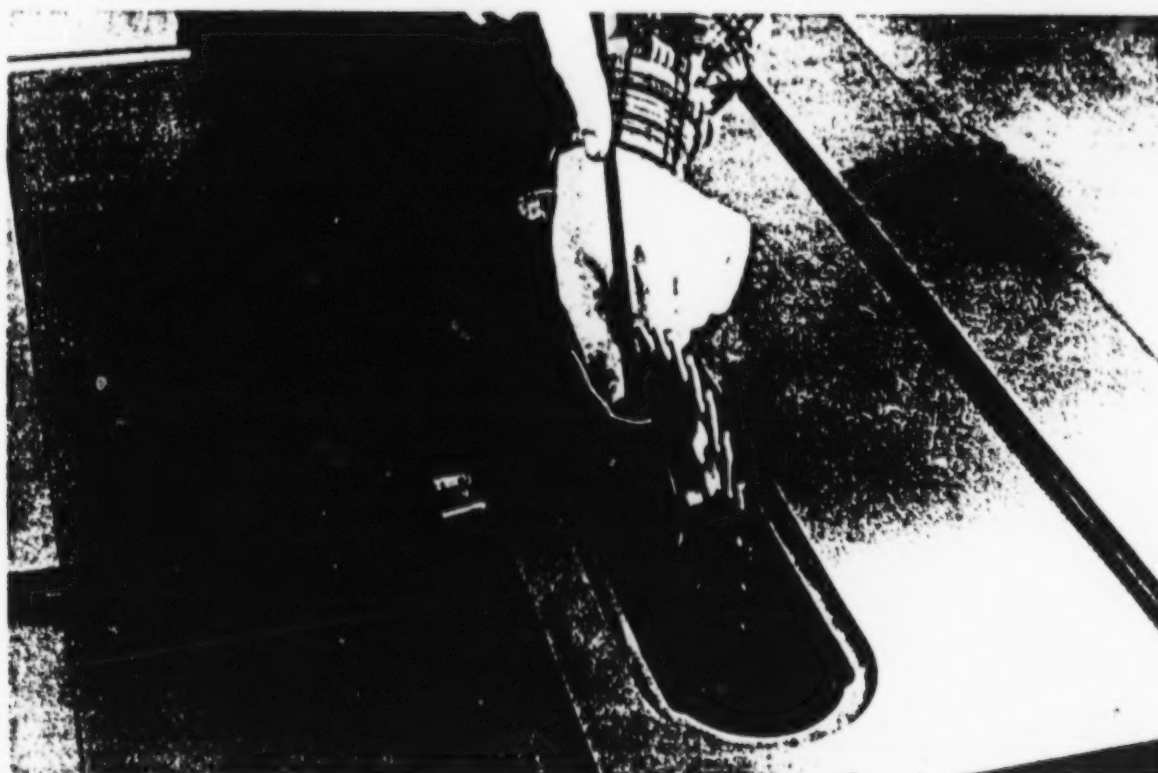


A throat plate must be used with the dado head. Turn the dado head over slowly to be sure it does not hit the throat plate. Make this check again if you tilt the dado head.

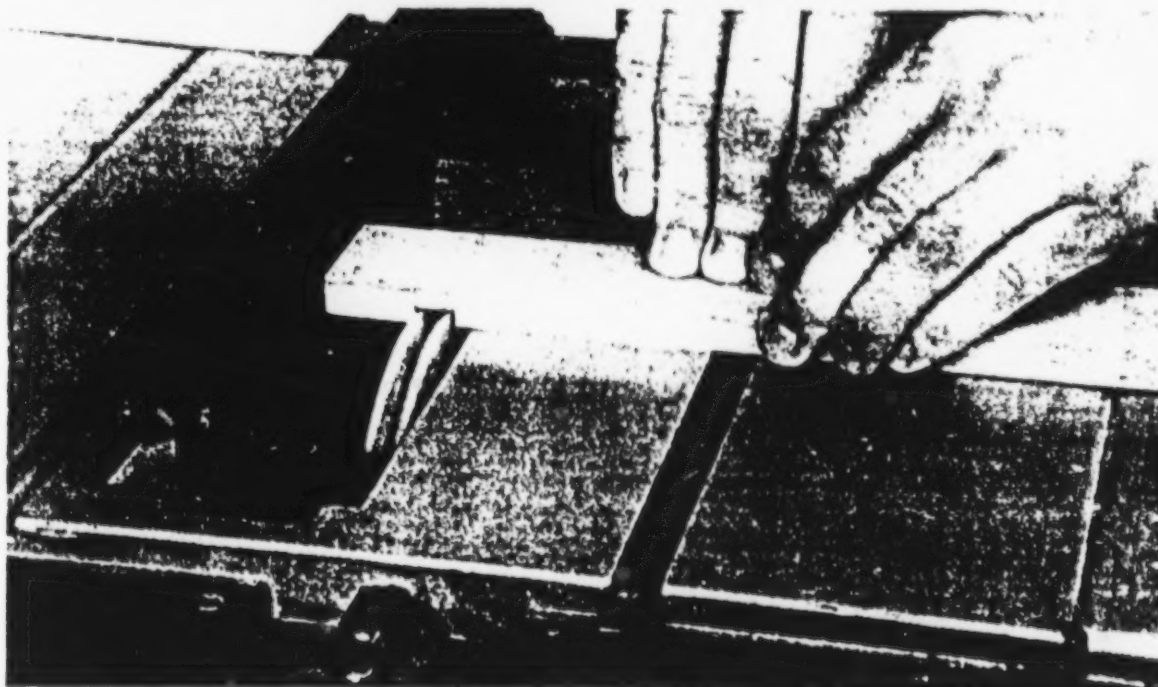
W.S. 11/17/88

40

BEST COPY AVAILABLE



Be consistent in how you tighten the dado head. It can affect dado width slightly.



Always check your set-up in scrap stock. If the width is correct, set the desired depth of cut. Note the piece of stock backing up the work. This eliminates tear-out.

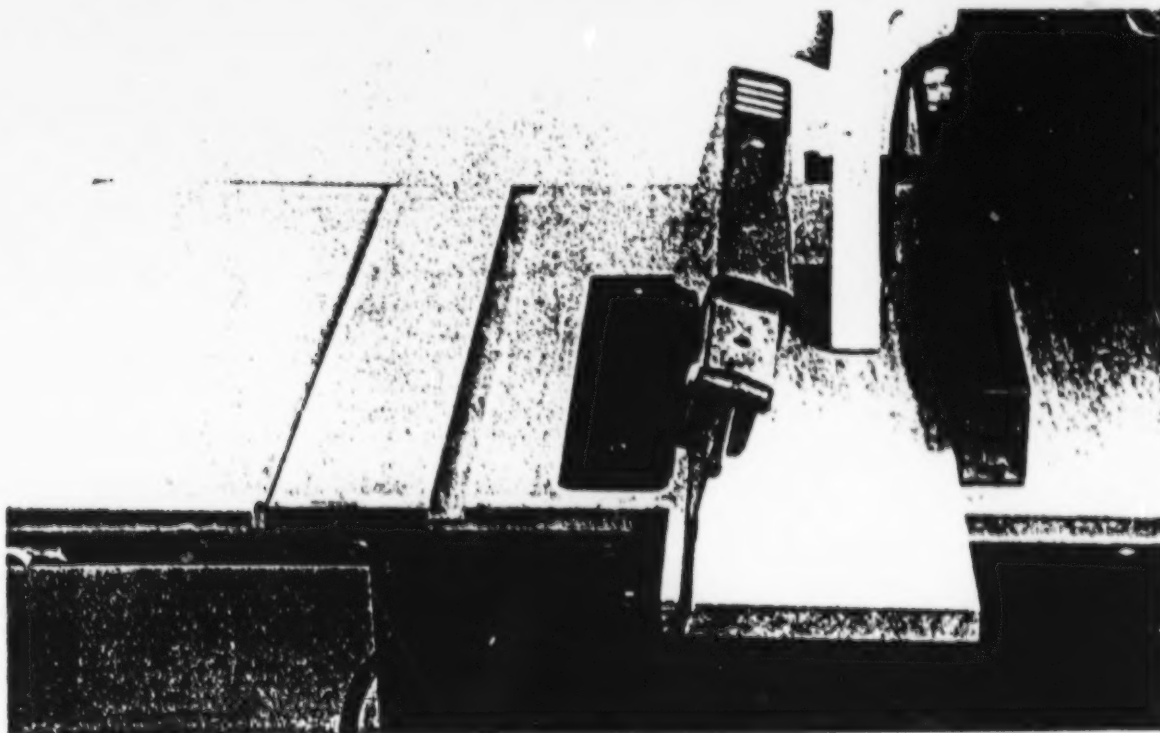
Handout # 21

BEVEL/MITERING

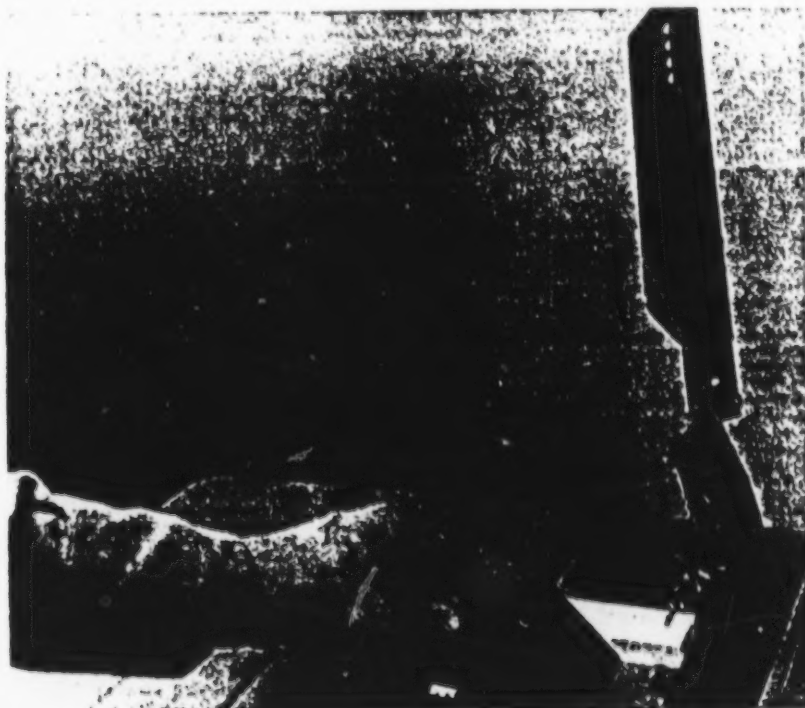
Name: _____

Last

First



Be sure the cut-off falls free when the cut is complete. When a scrap is pinched between the blade and fence, a kickback could result.

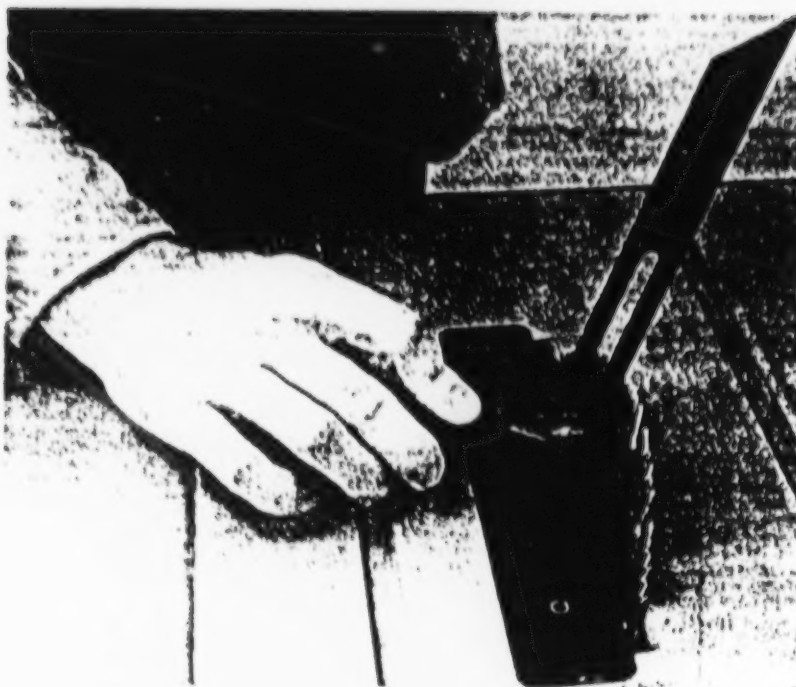


A bevel or chamfer cut on the end of your work is made in the same way as a crosscut

W.S. 11/17/98

BEST COPY AVAILABLE

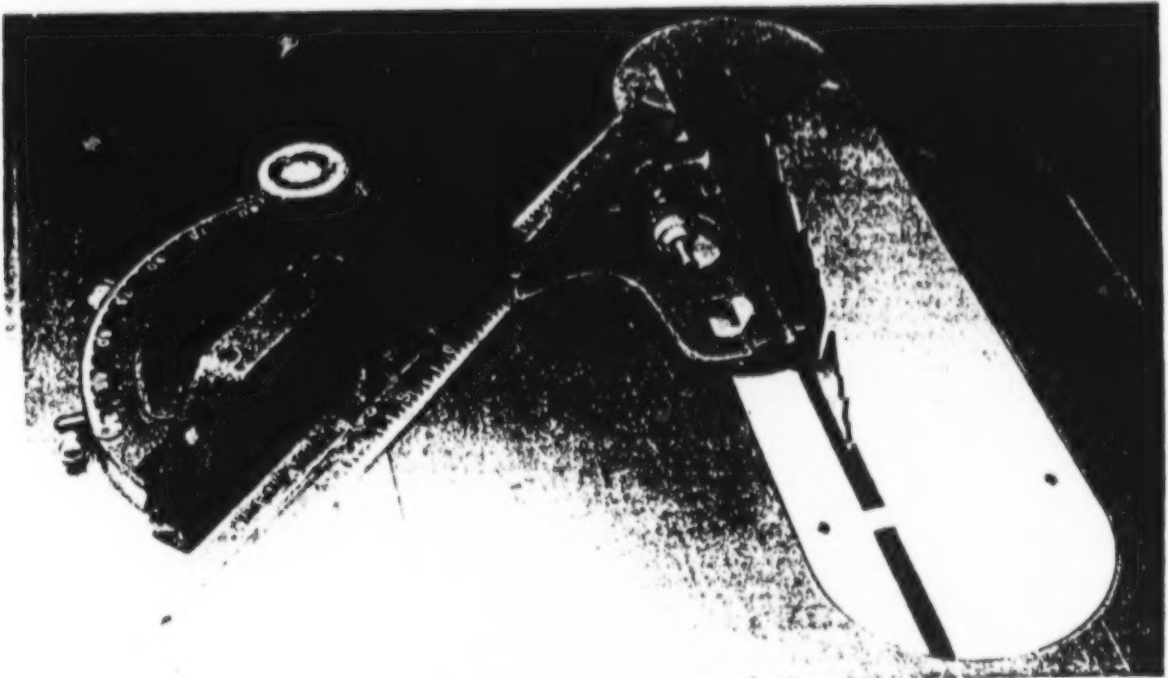
Name: _____
Last First



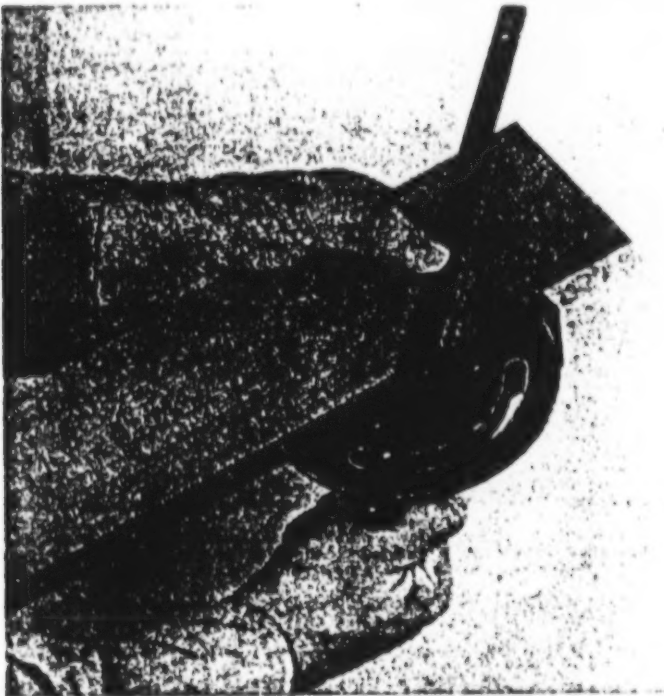
A sliding T-bevel will give you a more accurate setting than the scale on the saw. Use a protractor to set the sliding T-bevel.



A drafting square is one of the most accurate tools for setting the mitre gauge or blade for mitre cuts. Make sure that blade set does not affect your set-up.



A combination square used in this fashion produces a very accurate mitre. Be sure to keep the square off the blade's teeth.



The mitre gauge can be used to copy a layout line on your work. The head touches the edge of the work and the tongue is turned to the desired angle. Copying the angle directly off the work reduces the chance of error.

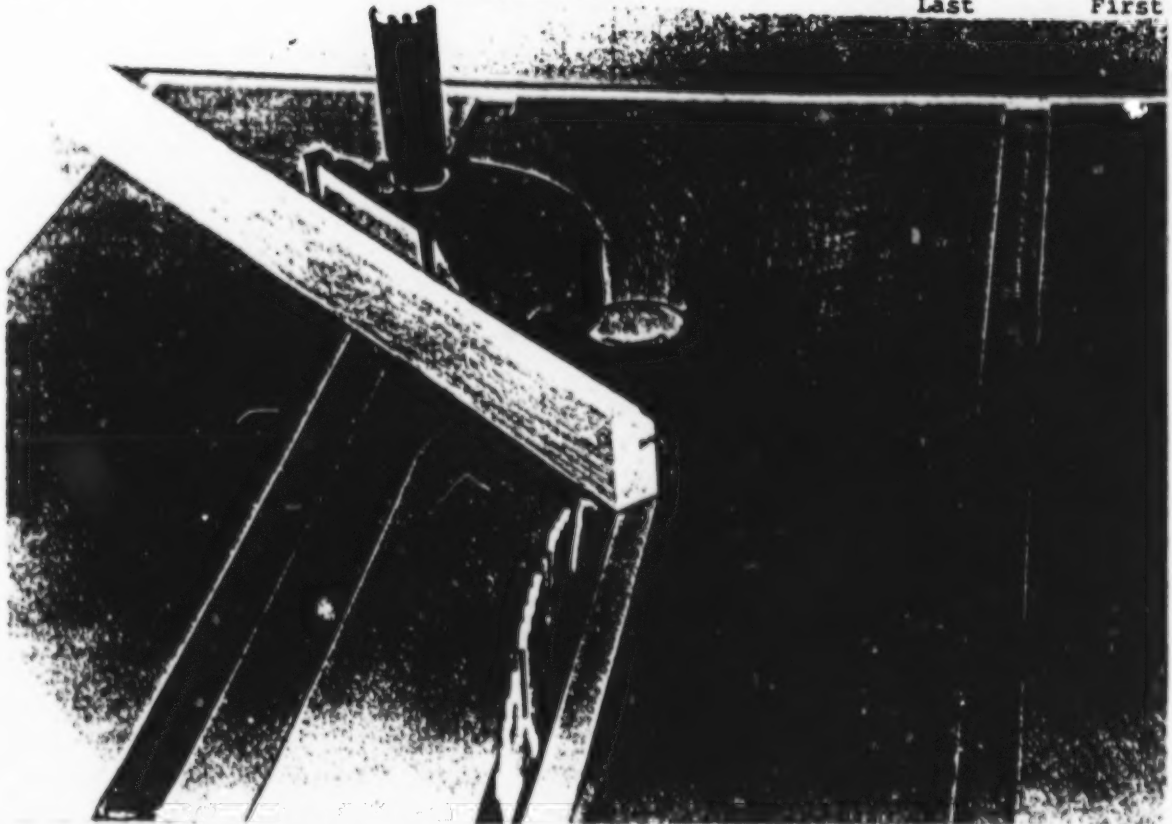
Handout # 24

BEVEL/MITERING

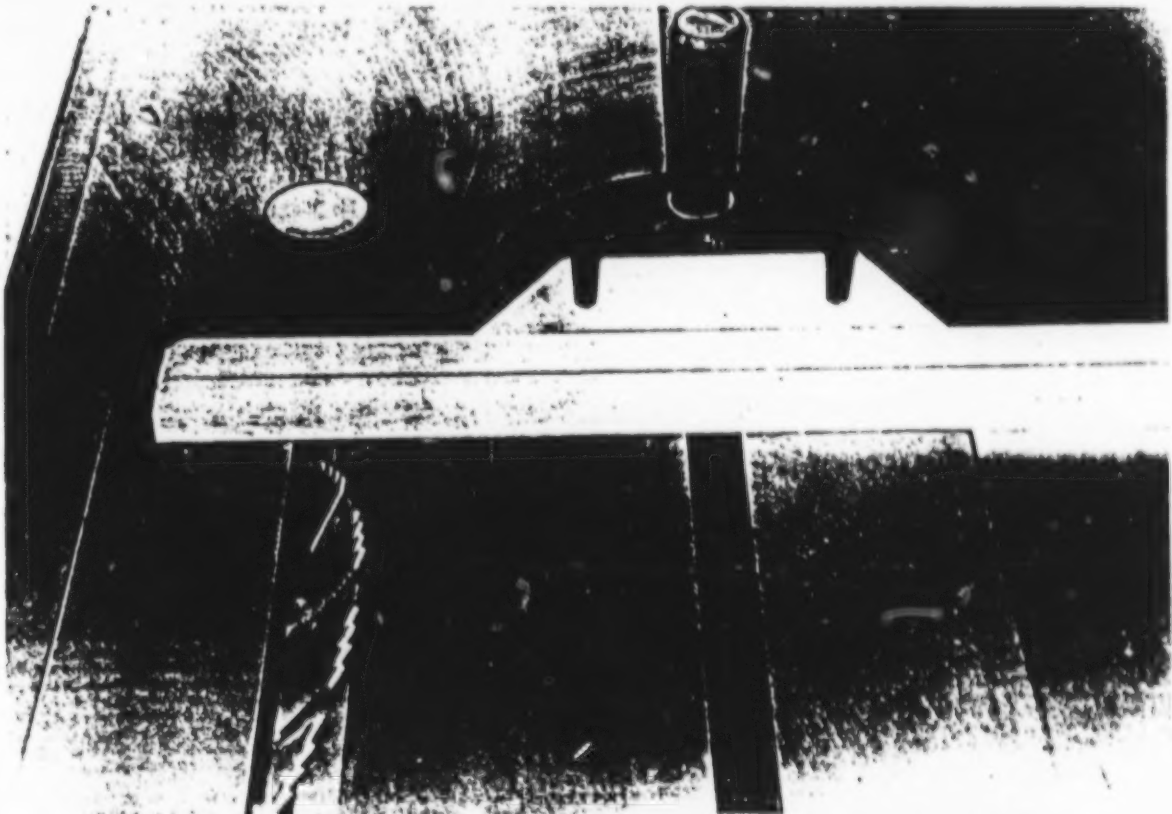
Name: _____

Last

First



Mitres can be cut with the stock on edge. The blade is set at 90° and the mitre gauge is set at 45°.



The blade may be tilted to 45° to cut the mitre. Set the mitre gauge to 90° before the blade is tilted.

W.S. 11/17/88

TABLE SAW
SAFETY EXAM

Write the word safe or unsafe in the space provided to describe the practices related to the safe operation of the bench saw.

- _____ 1. To wear loose clothing, long sleeves and neckties.
- _____ 2. To work on a littered floor.
- _____ 3. To remove sawed off scraps while the machine is running.
- _____ 4. To rip stock with the splitter guard in place.
- _____ 5. To place a sawblade on the arbor with the teeth pointing toward the direction from which the wood is to be fed.
- _____ 6. To remove guards without the instructor's permission.
- _____ 7. To extend the sawblade as far as possible through the stock.
- _____ 8. To saw warped and twisted stock.
- _____ 9. To do free hand sawing.
- _____ 10. To use a push stick when ripping narrow stock.
- _____ 11. To use the machine before the instructor has demonstrated its safe use.
- _____ 12. To stand directly in line with the saw blade.
- _____ 13. To refrain from talking with others while sawing.
- _____ 14. To saw stock containing nails, paint, sand, etc.
- _____ 15. To check the width of cut at front and back of blade for ripping.

I have taken the above exam and have correctly answered the questions: I have successfully demonstrated the safe operation of the bench saw with my instructor's supervision. I promise to conduct myself in such a fashion that I will not create hazards that may cause injury to others or myself.

Signed: _____
Student

Instructor

Date : _____

TABLE SAW
SAFETY EXAM

Write the word safe or unsafe in the space provided to describe the practices related to the safe operation of the bench saw.

- | | |
|---------------|--|
| <u>unsafe</u> | 1. To wear loose clothing, long sleeves and neckties. |
| <u>unsafe</u> | 2. To work on a littered floor. |
| <u>unsafe</u> | 3. To remove sawed off scraps while the machine is running. |
| <u>safe</u> | 4. To rip stock with the splitter guard in place. |
| <u>safe</u> | 5. To place a sawblade on the arbor with the teeth pointing toward the direction from which the wood is to be fed. |
| <u>unsafe</u> | 6. To remove guards without the instructor's permission. |
| <u>unsafe</u> | 7. To extend the sawblade as far as possible through the stock. |
| <u>unsafe</u> | 8. To saw warped and twisted stock. |
| <u>unsafe</u> | 9. To do free hand sawing. |
| <u>safe</u> | 10. To use a push stick when ripping narrow stock. |
| <u>unsafe</u> | 11. To use the machine before the instructor has demonstrated its safe use. |
| <u>unsafe</u> | 12. To stand directly in line with the saw blade. |
| <u>safe</u> | 13. To refrain from talking with others while sawing. |
| <u>unsafe</u> | 14. To saw stock containing nails, paint, sand, etc. |
| <u>safe</u> | 15. To check the width of cut at front and back of blade for ripping. |

I have taken the above exam and have correctly answered the questions: I have successfully demonstrated the safe operation of the bench saw with my instructor's supervision. I promise to conduct myself in such a fashion that I will not create hazards that may cause injury to others or myself.

Signed: _____
Student

Instructor

Date : _____

TABLE SAW EXAM PART I

INSTRUCTIONS TO STUDENTS: Answer all questions below.

1. What is a table saw?

2. Name four common adjustments on a table saw.

1.

2.

3.

4.

3. What is cross-cutting?

4. Name eight procedures for cross-cutting.

1.

2.

3.

4.

5.

6.

7.

8.

Table Saw Exam - Part I

2

5. What is ripping?

6. Name six procedures for ripping.

1.

2.

3.

4.

5.

6.

7. What is dadoing?

8. Name eight procedures for dadoing.

1.

2.

3.

4.

5.

6.

7.

8.

Table Saw Exam - Part I

3

9. What is beveling?
10. Name one procedure for beveling.
11. What is mitering?
12. Name one procedure for mitering.

Signed: _____

Student

Instructor

Date: _____

**TABLE SAW EXAM
PART I
ANSWERS**

1. What is a table saw?

A table saw is a stationary circular saw which is mounted on a worktable (usually cast-iron) so that the blade protrudes through the surface of the table.

2. Name four common adjustments on a table saw.

1. Raise or lower the saw blade by turning the raising handwheel.
2. Tilt the saw blade by turning the tilting handwheel.
3. Adjust the rip fence by releasing the fence clamp and sliding the rip fence on the guide bars to the left or right.
4. Adjust miter gage angle by loosening the securing knob and positioning the protractor scale to the desired angle.

3. What is cross-cutting?

Usually, cross-cutting is cutting wood against the grain but it is also defined as cutting stock to length regardless of grain direction.

4. Name eight procedures for cross-cutting.

1. Obtain the instructor's permission to use the saw.
2. Install a cross-cutting or combination blade.
3. Raise the saw blade 1/8"-1/4" above the workpiece.
4. Place miter gage in the table slot and position the work against the gage.
5. Turn the motor on and feed the stock slowly into the blade.
6. Never touch a free piece of work while the saw is running.

Table Saw Exam - Part I - Answers**2**

7. Continue feeding the stock until the piece is cut in two.

8. Turn the motor off.

5. What is ripping?

Usually, ripping is cutting wood with the grain but it is also defined as cutting a piece of wood in its longest dimension regardless of the grain.

6. Name six procedures for ripping.

1. Obtain the instructor's permission to use the saw.

2. Install a ripping or combination blade.

3. Raise the saw blade 1/8"-1/4" above the workpiece.

4. Position the rip fence to the desired width of cut.

5. Turn the motor on and feed the stock through until the cut is complete.

6. Turn the motor off.

7. What is dadoing?

Dadoing is cutting a rabbet or a wide groove into the work.

8. Name eight procedures for dadoing.

1. Obtain the instructor's permission to use the saw.

2. Install a dado head.

3. If ripping, position the rip fence to the desired width of cut.

4. If cross-cutting, adjust the miter gage to the desired setting.

5. Raise the dado head to the desired depth of cut.

Table Saw Exam - Part I - Answers

3

6. Make a test cut on a scrap piece of wood first.

7. Proceed by making the cut on the real workpiece.

8. Turn the motor off.

9. What is beveling?

Beveling is making a cut by tilting the blade 45 degrees.

10. Name one procedure for beveling.

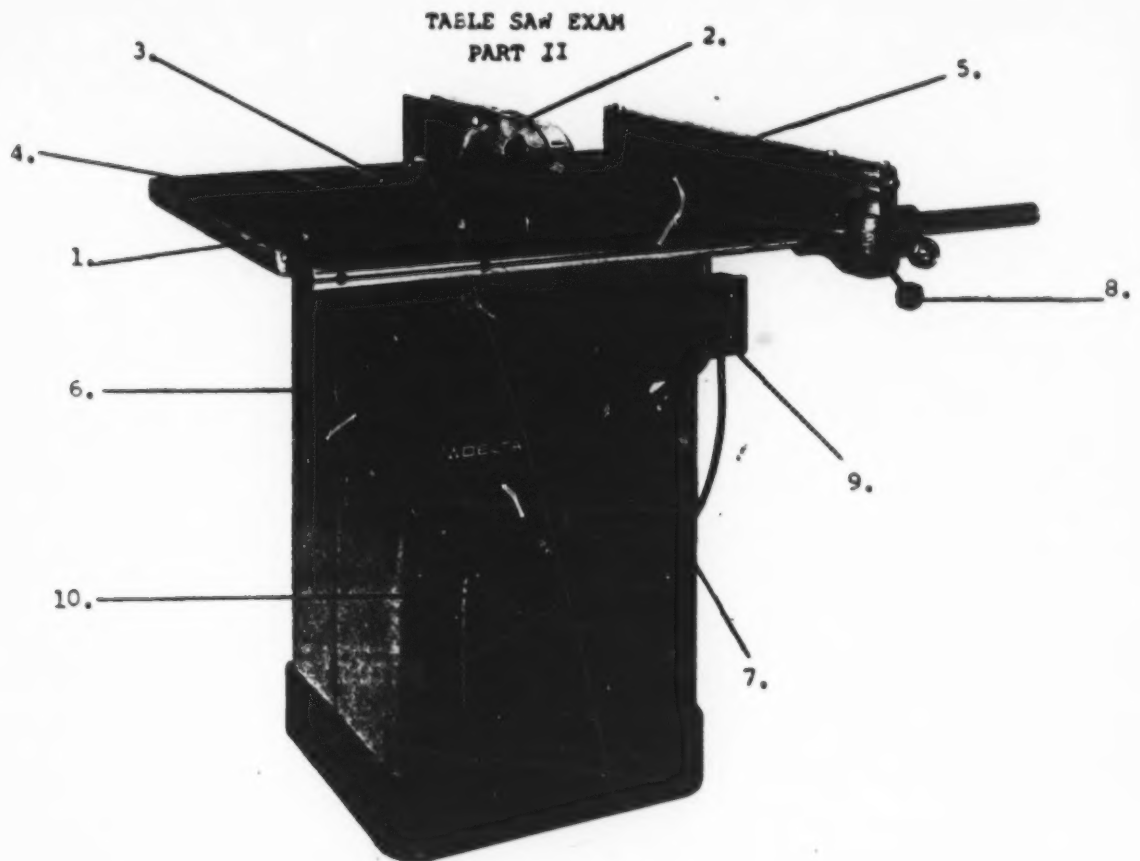
Turn the tilting handwheel until the blade is at a 45 degree angle and follow ripping procedures.

11. What is mitering?

Mitering is making a cut by setting the miter gage to 45 degrees.

12. Name one procedure for mitering.

Adjust the miter gage to a 45 degree angle and follow cross-cutting procedures.



INSTRUCTIONS TO STUDENTS: Study the table saw pictured above and write out the correct name for each numbered part in the space provided.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

INSTRUCTIONS TO STUDENTS: Study each statement below and circle (T) if the statement is true or (F) if the statement is false.

- T F 1. The table saw is well suited for ripping operations.
- T F 2. Blade height on the table saw is controlled by changing to larger or smaller diameter blades.
- T F 3. Only one style of blade is designed for use with the table saw.
- T F 4. The table saw is sometimes known as a tilting arbor saw.

- T F 5. The table saw blade may be tilted.
T F 6. The table saw may be used for making dado cuts.
T F 7. The table saw must be running while adjustments are made.
T F 8. The miter gage is used for cross-cutting operations.

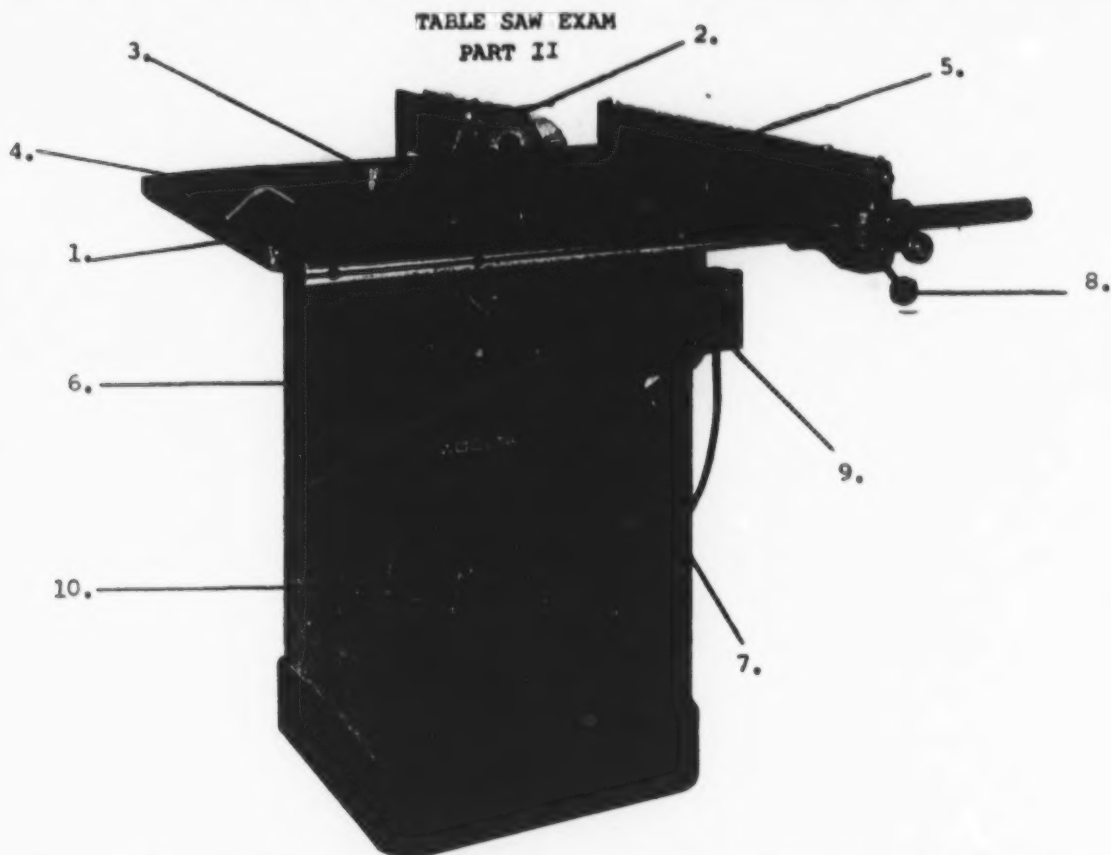
INSTRUCTIONS TO STUDENTS: Match the correct accessory or device with the operations described below.

- | | |
|---|----------------|
| ___ 1. Used for pushing narrow stock during ripping operations. | A. Combination |
| ___ 2. Used for most cross-cutting operations. | B. Splitter |
| ___ 3. Used to gauge length when cutting several pieces of stock to identical length. | C. Miter gage |
| ___ 4. Used to guide stock for ripping operations. | D. Push stick |
| ___ 5. Type of blade that can be used for both cross-cutting and ripping operations. | E. Rip fence |
| ___ 6. Type of blade that leaves a wide kerf. | F. Dado cutter |
| ___ 7. Used to keep stock that is being ripped from binding shut on the blade. | G. Stop block |

Signed: _____
Student

Instructor

Date: _____



INSTRUCTIONS TO STUDENTS: Study the table saw pictured above and write out the correct name for each numbered part in the space provided.

1. Miter gage
2. Saw guard
3. Slot for miter gage
4. Table
5. Rip fence
6. Tilting handwheel
7. Raising and lowering handwheel
8. Fence clamp
9. On/off switch
10. Clean out

INSTRUCTIONS TO STUDENTS: Study each statement below and circle (T) if the statement is true or (F) if the statement is false.

- ☐ T ☐ F 1. The table saw is well suited for ripping operations.
- ☐ T ☒ F 2. Blade height on the table saw is controlled by changing to larger or smaller diameter blades.
- ☐ T ☒ F 3. Only one style of blade is designed for use with the table saw.
- ☒ T ☐ F 4. The table saw is sometimes known as a tilting arbor saw.

- ☐ T ☐ F 5. The table saw blade may be tilted.
☐ T ☐ F 6. The table saw may be used for making dado cuts.
☐ T ☐ F 7. The table saw must be running while adjustments are made.
☐ T ☐ F 8. The miter gage is used for cross-cutting operations.

INSTRUCTIONS TO STUDENTS: Match the correct accessory or device with the operations described below.

- | | |
|--|----------------|
| <u>D</u> 1. Used for pushing narrow stock during ripping operations. | A. Combination |
| <u>C</u> 2. Used for most cross-cutting operations. | B. Splitter |
| <u>G</u> 3. Used to gauge length when cutting several pieces of stock to identical length. | C. Miter gage |
| <u>E</u> 4. Used to guide stock for ripping operations. | D. Push stick |
| <u>A</u> 5. Type of blade that can be used for both cross-cutting and ripping operations. | E. Rip fence |
| <u>F</u> 6. Type of blade that leaves a wide kerf. | F. Dado cutter |
| <u>B</u> 7. Used to keep stock that is being ripped from binding shut on the blade. | G. Stop block |

Signed: _____
Student

Instructor

Date: _____